The IRON AGE

June 9, 1960 A Chilton Publication The National Metalworking Weekly

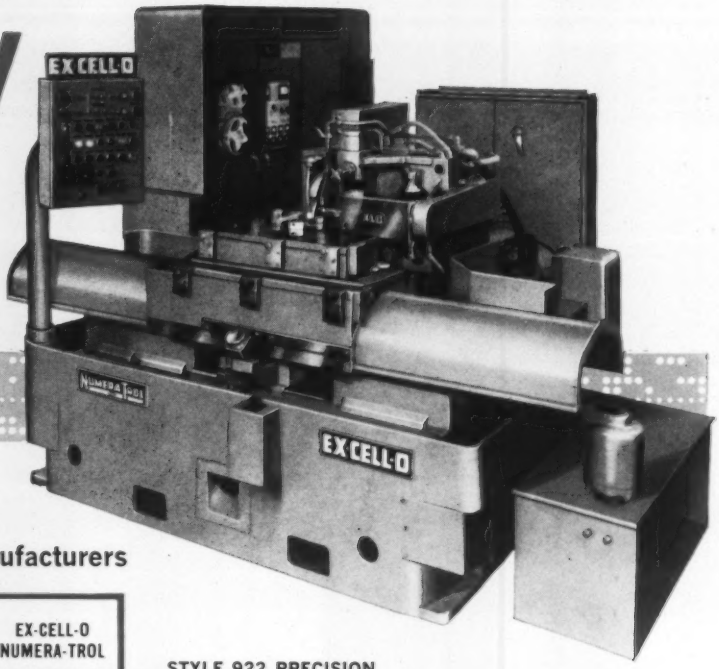
Seaway Struggles To Overcome Growing Pains P. 63

Where Is Business Headed Now? – P. 68

Small Forger Competes With the Big Shops – P.101

Digest of the Week – P. 2-3

a study in time



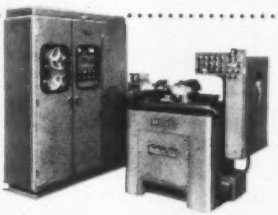
How Ex-Cell-O Numera-Trol Cuts Costs for Three Modern Manufacturers

Part: TEMPLETS	CONVENTIONAL METHODS	EX-CELL-O NUMERA-TROL
Lead time	128 hrs.	16 hrs.
Grinding per/piece	60 hrs.	6 hrs.
TIME SAVED	166 HOURS	

Part: FUEL CONTROL CAMS	CONVENTIONAL METHODS	EX-CELL-O NUMERA-TROL
Lead time	150 hrs.	40 hrs.
Machining per/piece	80 hrs.	7.5 hrs.
TIME SAVED	182.5 HOURS	

Part: STEAM TURBINE BUCKETS	CONVENTIONAL METHODS	EX-CELL-O NUMERA-TROL
Lead time	144 hrs.	24 hrs.
Machining per/piece	90 hrs.	12 hrs.
TIME SAVED	198 HOURS	

STYLE 922 PRECISION CONTOURING MACHINE
Slides are controllable to .000025". Grinding unit is interchangeable with boring and turning unit.



PRECISION CAM-MILLING MACHINE
Slashes lead time in producing drum-type cams.

PRECISION PROFILING MACHINE
Performs intricate and accurate milling and grinding of 3-dimensional forms.

Are you faced with tough prototypes or production parts that "can't" be produced economically? See your Ex-Cell-O Representative, or write direct for details on how you can apply Ex-Cell-O's Numera-Trol system of tape-controlled precision machine tools to do more jobs, faster and more accurately!

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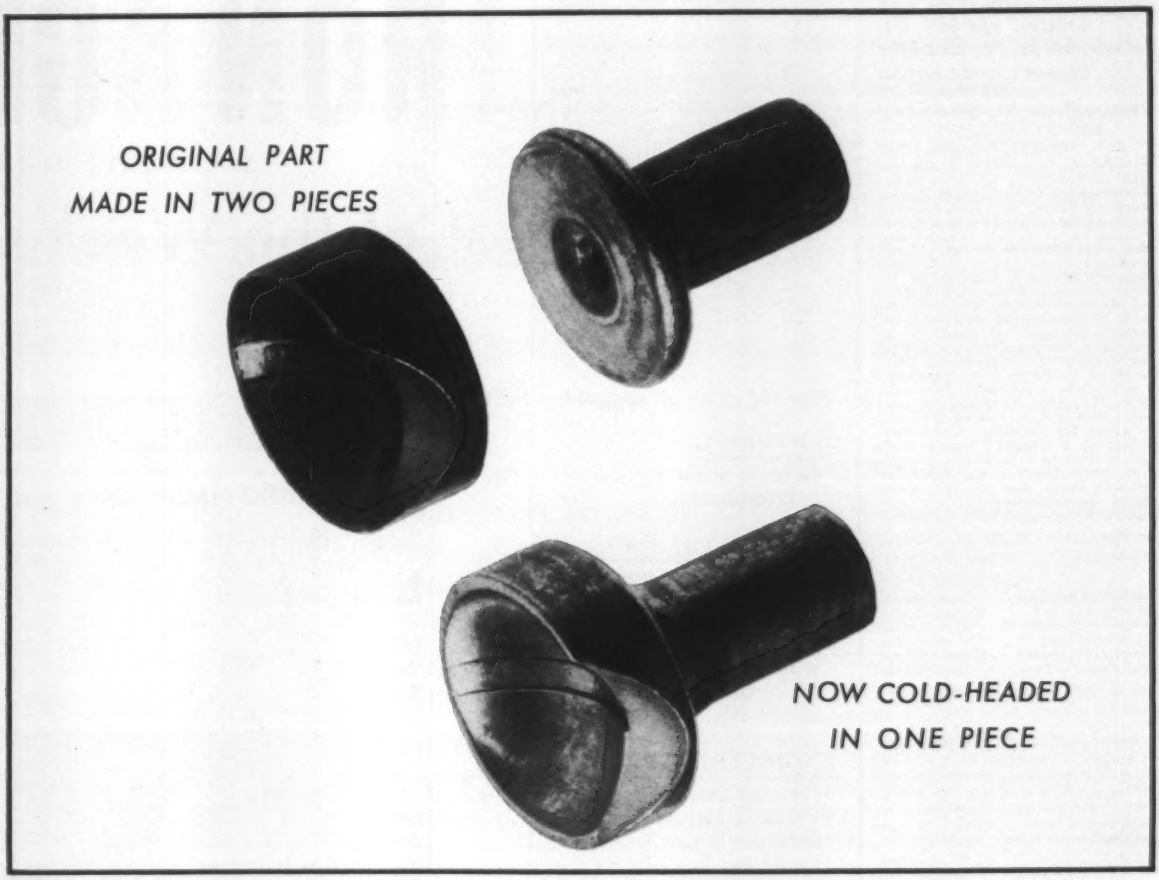
SEE EX-CELL-O'S BOOTH 946, NMTBA EXPOSITION



Cold-heading cuts costs— replaces two parts with one!

The two-piece part, comprising a stud and a seat, has been replaced by a single part which is now cold-headed at considerable savings. It's used in the assembly of an automotive steering-rod relay system.

A special type of Bethlehem cold-heading wire was developed for this job. Costs are well under the previous method of manufacture. Cups have good surface finish and high strength.

This is a typical example of the small parts which are constantly under study by manufacturers searching for better materials, improved methods, and lower costs.

Look at these advantages of cold-heading

High-speed production . . . low scrap loss . . . economical stock . . . high strength . . . minimum of finishing operations.

Perhaps your product can be cold-headed

Heading-quality wire, custom-made for the job, has long been a Bethlehem specialty. Our metallurgical engineers will gladly work with you if you have a product that might be cold-headed. For any of your wire needs, call your nearby Bethlehem office, or write us at Bethlehem, Pa.

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The IRON AGE

June 9, 1960—Vol. 185, No. 23

Digest of the Week in

★Starred items are digested at right.

EDITORIAL

Defense Spending: Let's Not Go Overboard 7

NEWS OF THE INDUSTRY

★Seaway Fights Growing Pains 63
★Coming: More Vending Machines 66
★Are Foundries Next for Oxygen? 67
★Is Business Headed Up or Down? 68
Why Steel Lags Behind Economy 70
New Mine Planned in Wyoming 71
The IRON AGE Salutes 75

ENGINEERING-PRODUCTION

★How the Small Forger Can Compete 101
★Versatile Boring Machine 104
★Extend Furnace Controller Life 106
★Producing High-Purity Nitrogen 108
★Cost Saving Slag Thinner 110
Roll Stainless Forms to Shape 113
Process Cleans Cast Magnesium 114
Stamped Parts Keep Costs Low 116

NEWS ANALYSIS

Newsfront 9
★**Report to Management** 77
★Automotive 79
★Washington 83
Machine Tools 85
★West Coast 86

MARKET AND PRICE TRENDS

Market Planning Digest 61
★The IRON AGE Summary 149
★Purchasing 150
Iron and Steel Scrap Markets 154
Nonferrous Markets 158

REGULAR DEPARTMENTS

Letters From Readers 11
Fatigue Cracks 13
Industrial Briefs 88
Men in Metalworking 92
You Arbitrate It 96
Free Literature 118
Design Digest 128
New Equipment 136
Clearing House 168

INDEX TO ADVERTISERS 171

News of the Industry

VENDING MACHINES

Builders Are Busy—Demand for vending machines increases as public uses them to buy a growing variety of products. The amount marketed through machines could double by 1965. P. 66

STEEL FOUNDRIES

Interest In Oxygen? — Foundrymen are showing interest in adapting oxygen steelmaking techniques to foundry practice. Under certain conditions, it might offer advantages over electric arc furnaces. P. 67

BUSINESS OUTLOOK

Confused Situation — Economic indicators are confused at best. But in this analysis of the business outlook, Editor-in-Chief Tom Campbell tells why a serious recession is unlikely. P. 68

WYOMING IRON MINE

USS Plans Ahead—U. S. Steel plans to have a new iron mining and beneficiation facility completed by end of 1962. P. 71

Metalworking

Cover Feature

St. Lawrence Seaway—The Seaway is still suffering growing pains. Volume was short of expectations last year. Labor problems plague it this year. But more and more foreign ships (cover photo) will call at Great Lakes ports. P. 63

THE DOWNED U-2

Editor's View — Editor George Sullivan comments on the U-2 incident and tells first hand what Sverdlovsk means in terms of Soviet metalworking. Mr. Sullivan was a member of an official U. S. mission to that Serbian metalworking center in 1958. P. 77

Engineering-Production Developments

DROP FORGING

In the Small Shop — A recent study conducted by a small forging shop might come as good news to the little man in metalworking. Tips are given which should help the small shop compete with its big automated rival. But the small shop must depend on modern techniques and design to succeed. P. 101

MACHINING CAST IRON

New Boring Setup—Two six-station boring machines are slicing four hours from former production time in machining a cast iron motor body. Starting from solid, the machines drill, ream, bore, counterbore, groove and tap. Each machine is equipped with six hydraulic-fed boring units. P. 104

SYNTHETIC DIAPHRAGMS

Aid Heating Line—Two control factors are vital in trouble-free operation of steel furnace lines. Both hinge on accurate maintenance. One centers on the need for a constant gas to air ratio. The other involves fixed delivery pressure of the mixture. P. 106

HIGH PURITY NITROGEN

Generating It—Nitrogen acts as a purge to eliminate undesirable gases in many metalworking operations. A fully automatic unit delivers an atmosphere that is 99.99 pct pure nitrogen. And it's a low cost process. P. 108

SLAG THINNER

Cuts Refractory Damage—From an economic viewpoint, there's no doubt that a new slag thinner can save money. It costs about one-third as much as fluorspar. And it doesn't alter the properties of the steels produced. P. 110

Market and Price Trends

AUTOMOTIVE

Ceramic-Coated Muffler—A new muffler material is stirring a controversy among automakers. If it proves successful, it could save customers big replacement costs. P. 79

WEST COAST

Recession in '61? — Purchasing agents gathered for annual meeting at Los Angeles hear a recession is possible next year. They are also told worries about adequate steel supplies are over. P. 86

WASHINGTON

More Dollars for Defense—Prodded by Congress, the military is acting to boost defense spending, following summit blowup. P. 83

STEEL SUMMARY

Orders Lag—The rate of new steel orders continues to disappoint. Order volume for major mills is not strong enough to justify an operating rate of more than 50 pct. P. 149

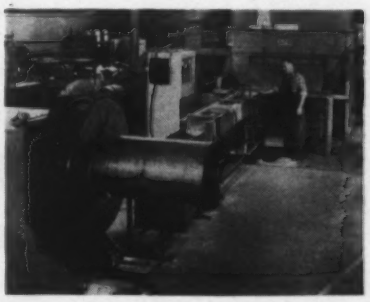
PURCHASING

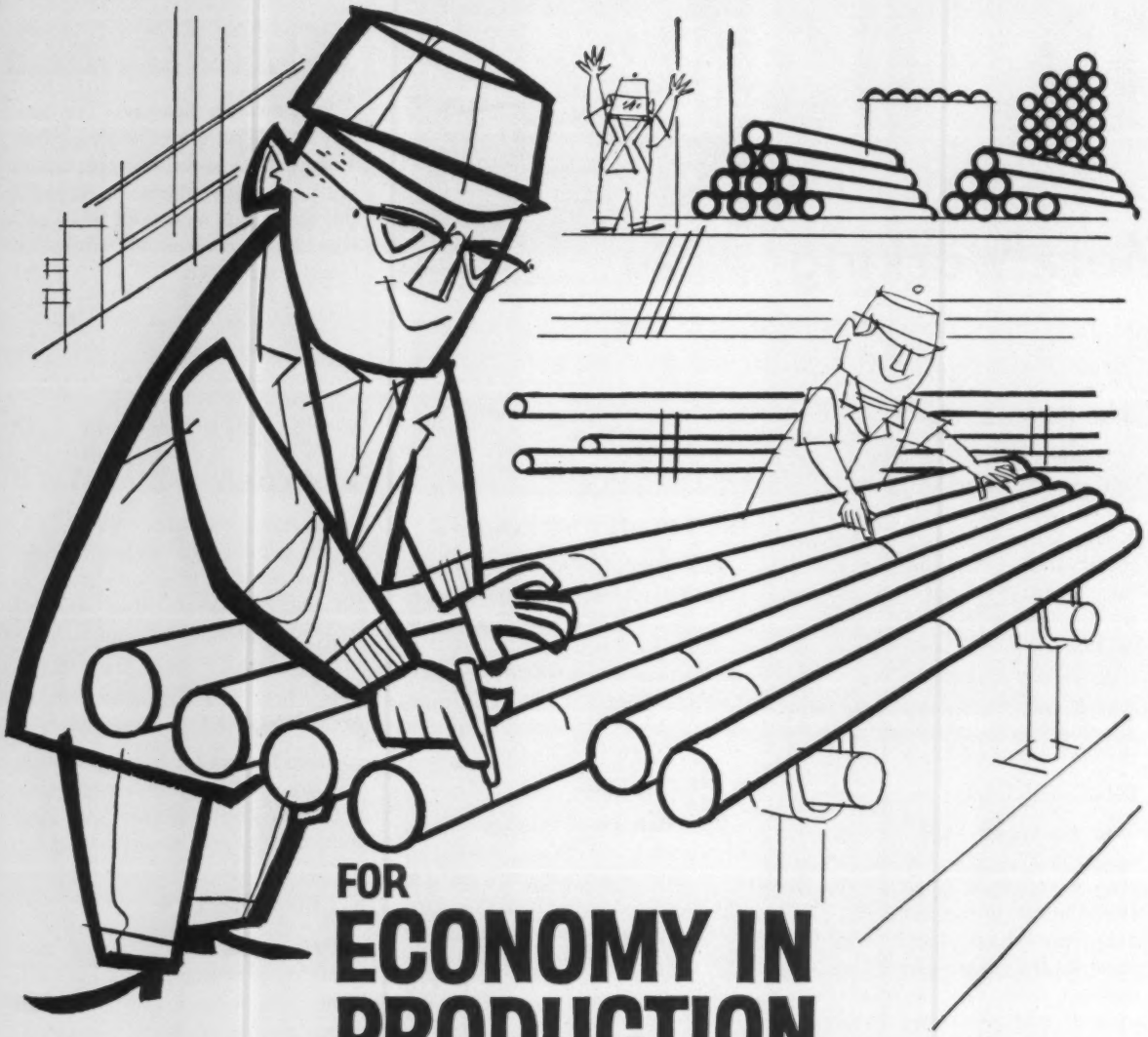
The Clinics—Casting clinics are helping buyers and design engineers learn proper casting uses. The clinics are attracting a great deal of attention from industry. P. 150

NEXT WEEK

STRIP CLEANING

By Ultrasonics — Several steel companies have completed tests on the descaling of steel strip. An article in next week's issue will point up some of the benefits of one process: an ultrasonic follow-up of blast cleaning.





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This belt lived 3 lives before accident killed it off

THE conveyor belt previously used in this foundry lasted only a year, had to be repaired frequently. The intense heat blistered and scorched it, hardened and cracked the rubber.

When a B.F.Goodrich distributor heard of the problem, he recommended a BFG belt that was specially developed for carrying hot materials. This belt is made with a heat-resisting rubber that can stand temperatures that char or burn ordinary rubber belts.

The B.F.Goodrich hot-material belt lasted three years—two years longer than the belt it replaced. Even then, it was an accident, not heat prostration, that killed it off. As the head of plant maintenance put it: "No one knows how long this belt might have lasted if it hadn't been accidentally ripped."

In this foundry, the purchasing agent had a good rule. Instead of accepting the high cost of frequent replacements, he called in a BFG distributor and found exactly what he needed to keep the plant running with fewer shutdowns and delays.

Your B.F.Goodrich distributor has the exact specifications for the belt described here. And, as a factory-trained specialist in rubber products, he can answer your questions about the many products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Company, Dept. M-850, Akron 18, Ohio.*

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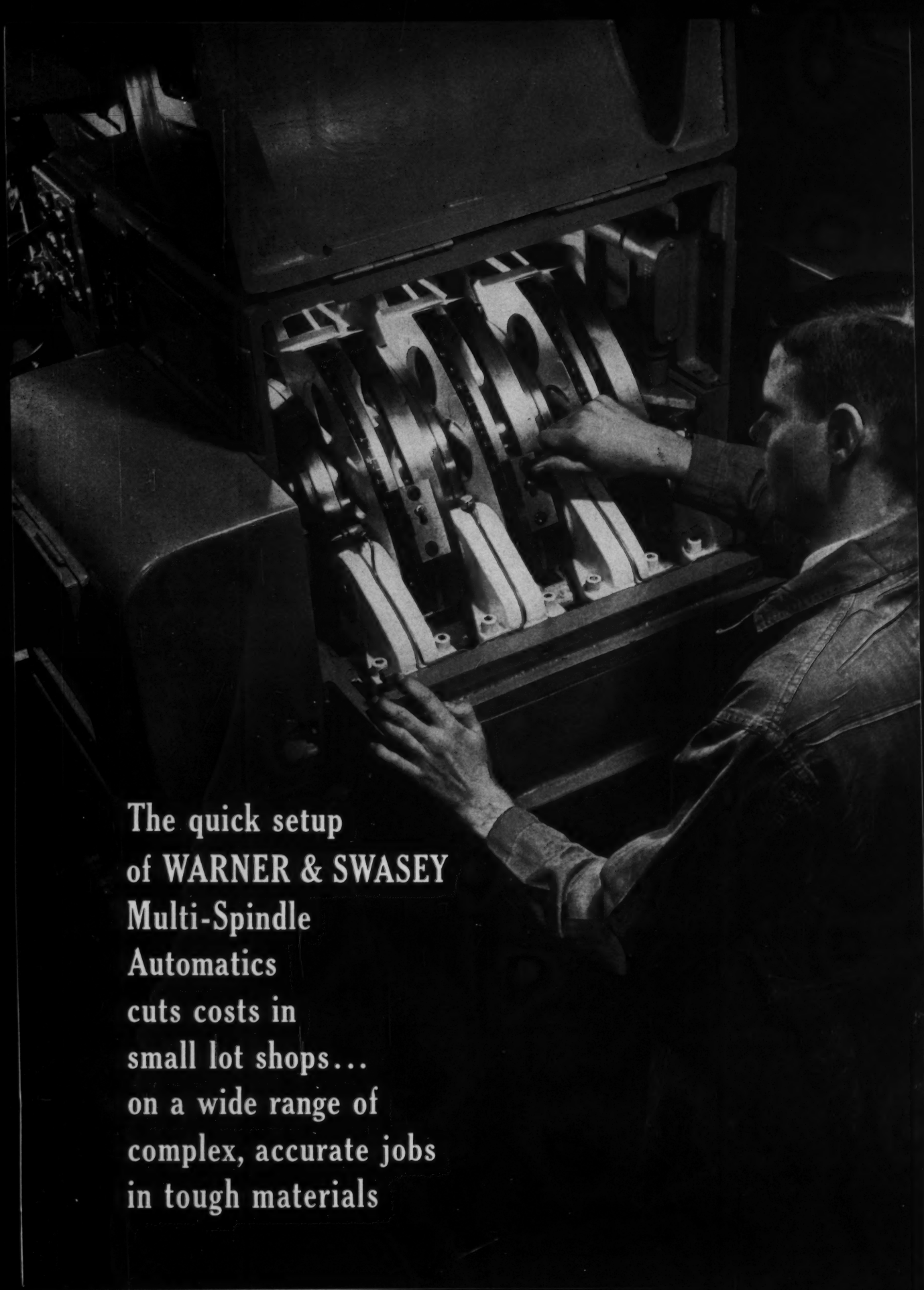
CONVEYOR BELTS



The quick setup
of WARNER & SWASEY
Multi-Spindle
Automatics
cuts costs in
small lot shops...
on a wide range of
complex, accurate jobs
in tough materials

Defense Spending: Let's Not Go Overboard

The hue and cry for bigger and "better" defense spending will be in full blast soon. Part of the hot air will be for political purposes.

Before we go off half cocked just because Mr. Khrushchev lost a few of his marbles at Paris, we had better do some serious thinking.

Because of the U-2 incident and the collapse of the Summit meetings, we know a great deal more about our defenses. Also, we have seen proof of substantial progress in our space program, in our missile performance, and in the quality of our intelligence.

We also know that the defenses of the Soviets are not as good as they have claimed. That was one good result of the U-2 incident. But this does not mean we can sit back and pat ourselves on the back. Nor does it mean that Russia may not reach a much better rocket performance and radar technique than she appears to have so far.

Even though there should be no half-baked speedup of defense spending — just to spend money—we probably should do a little double checking. But, in doing this, politics should be left out of the picture. It is well to realize that we have upped our space and missile program spending. To pour more money in this now would be of little real value. But to keep up the good work is the thing to do.

The Army probably needs more attention in view of the Berlin and Asian sensitivity. But Congress knows what the Army wants and needs and should be in a good position to take proper action at budget time.

The usual cry for more defense to insure better business and fewer layoffs will be in the hopper soon. But those who know about the lag in defense spending plans ridicule such talk. It would take a year or more before any large defense increase would affect the general economy. Anyway, higher defense spending for reasons other than political is already in the wood.

Mr. K's outburst does not change our defense position one iota. The Administration has taken the long-term view of being prepared continuously instead of going at it by fits and jerks.

If we are to have a revision of our defense programs, let's do it after the election. It will be better that way. Also, we can see that our presently-approved programs are carried out quickly and efficiently.

Judging from what has leaked out, our country is in pretty good shape—defensewise.

Tom Campbell

Editor-in-Chief

• specify • specify

set your line with extra sales bait

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for COST SAVINGS

With today's squeeze between manufacturing cost and a selling price that moves products with satisfactory profit, every production saving deserves careful consideration. That's why many manufacturers are using Inland TI-CO galvanized sheets to more economically provide corrosion resistance for their product. ■ Many times TI-CO can be substituted for more expensive materials. TI-CO can eliminate the need for protective painting . . . often is less expensive. Or, if in your processing you normally form and then pot-dip production parts, this costly step can be eliminated by simply forming the part with the galvanized sheet that takes the toughest fabricating, yet won't chip, peel, crack or flake . . . TI-CO. You'll add extra "sales bait" at the purchaser's level too!

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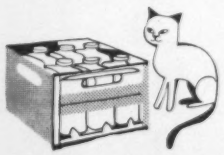
INLAND

Garage door maker saved costs of pot-dipping zinc coated steel rails and hardware when he switched to non-flaking TI-CO.



Manufacturer of milk cases obtained corrosion resistance and increased strength at reduced cost when he substituted non-flaking TI-CO for more costly metal.

TI-CO eliminated painting of hot rolled steel and provided added corrosion resistance for auto wheel suspension component.

Neutrons Detect Moisture

Average moisture content of a batch of foundry sand can be measured by a nuclear gage. Fast neutrons radiate in all directions from the radioactive source. Collisions with hydrogen nuclei, in the form of water, reduce the neutrons' speed. Use of a detector that senses only slow neutrons relates the output directly to moisture content.

Memory Replaces Tracer

An electronic memory device, developed for machine tools, operates without tooling for tracer work. On a lathe, it records set-up data on the first run. All other parts go through the cutting cycle automatically. The unit allows changes in dimensions, speeds or feeds, and tool changes without altering the rest of the operation.

New Engine for Mercury?

Mercury is ready to come out with a 6-cylinder car. It will be the first one offered by Mercury. It's believed the engine will be a 145 hp, inline, overhead-valve unit—used by Edsel prior to its demise. Success of the Dart, Dodge's low-price competitor to Chevrolet, Ford and Plymouth is believed to be a major influence in Mercury's move.

Extends Use of Alumina

Dr. Guy Suits, GE vice president and director of research, has announced a new alloy for use in ceramic-to-metal seals. "Fernico-5 is of major significance," says Dr. Suits, "because it closely matches the thermal expansion of alumina, the ceramic that possesses the . . . properties for general use in the electrical industry."

Resists Corrosion at 1000°F

Progress has been made in the search for a corrosion-resistant, high-temperature steel for use up to 1000°F. A total of 64 different sample ingots have been poured and tested—15 of which were vacuum-induction melted. One meets all requirements. These include: good oxidation and corrosion resistance; adequate mechanical strength; elevated-temperature hardness retention; and dimensional stability during exposures up to 1000 hours.

Clean Without Damage

A five-solution process serves in the overhaul cleaning of jet engines. Cleaning the various high-temperature alloys poses a problem. Deposits must be removed without changing dimensions or surface finishes of the metals. The new compounds meet these requirements—and they reduce cleaning-compound costs.

Furnace Serves Dual Role

Conversion from aluminum to steel heat treating takes about 4 hours in a gantry-type furnace in use at The Marquardt Aircraft Corp. When heat treating aluminum, temperatures are held to ±5°F in a range of 250° to 1400°F. For steel alloys, the temperature range is 1200° to 2000°F with a uniformity of ±5°F.

Increases Fatigue Strength

Coatings of certain polar organic compounds increase the fatigue strength of steel, magnesium and copper-beryllium alloys. Compounds found most beneficial have a carbon chain of at least twelve—with a polar group at one end. Apparently the polar group attaches to a metal in such a way that it forms a tightly packed monomolecular film. This film acts as a barrier to water and oxygen molecules.

Adhesive Bonds Auto Hood

Engineers at the Ford Motor Co. have devised a novel means of preventing high-speed hood flutter. They "spot weld" inner and outer panels together with a flexible adhesive. Two shots complete the 90 daubs positioned on each hood. Each inner panel then mates with its hood and is hem welded. The neoprene-based adhesive develops a bond strength of about 80 psi.

Torrington Needle Bearings are available for shafts up to 7¼" in diameter. Full complement of rollers provides highest radial capacity for a given cross section. They offer low unit cost, compactness and light weight and long service life. They take a press fit in a simple straight-bore housing, run directly on hardened shafts, permitting use of larger and stiffer shafts.

Why not put a Torrington Needle Bearing on that large shaft?

You have everything to gain by applying a large diameter Torrington Needle Bearing in your heavy duty applications.

There's the unusual economy in price and installation cost over other anti-friction bearings of comparable size. Simplicity of design of related components saves even more. Unequaled capacity for a given cross section, good lubrication and efficient anti-friction operation mean long service life.

These advantages have been proved in performance in tractor bolsters, transmissions and final drives. In haybaler crank shafts. In power shovels. In heavy duty hydraulic pumps and starting motors. In road wheel arms on tanks. Why not talk over *your* application with your Torrington representative?

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Commendation

Sir—I have read the article on the Military Industrial Supply Agency written by your Mr. Paul J. Cathey which appeared in the May 19 issue of The IRON AGE.

The job of pulling together all the material concerning MISA was a most difficult one. The resulting article was well organized and informative.

The facts as presented should prove most valuable to your many subscribers and advertisers. As a matter of information, 25 pct of the advertisers in a recent edition of The IRON AGE appeared on the Navy General Stores Supply Office Bidders List.—J. W. Bottoms, Captain, SC, USN.

Bowed Heads

Sir—I am surprised to read in the lead paragraph of "Fatigue Cracks," May 26, that it is implied that any readers of The IRON AGE would be other than literate. Of course, Webster's Unabridged sanctions the use of "literate" in the sense of "of or skilled in literature"; yet most of us, including readers of The IRON AGE, are more likely to use the word in the sense of Webster's primary definition, "educated; especially, able to read and write."

Is it, perchance, a coincidence that this article, the opening sentence of which contains the word "literate," should in its final sentence contain the phrases "augers well" and "augers in his own speech?" Since I find no sanction for the use of "auger" as a verb, I conclude that I am one of your illiterate readers when I think of an auger as a tool with which to bore holes. Or, since the word appears in quotations purported to be from your writings, has a shadow been cast upon your literacy?—Carl H. Morken, vice president and works manager, The Kennedy Valve Manufacturing Co., Elmira, N. Y.

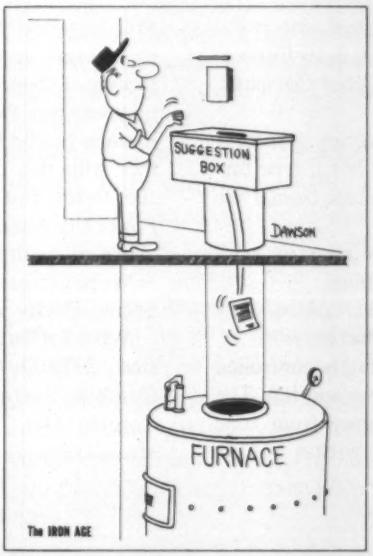
▪ **We plead a temporary lapse into illiteracy. We meant, of course, "augurs." And we also apologize to any IRON AGE readers who may feel their own literacy was impugned. And it doesn't "augur well" for our editor either.—Ed.**

Molten Metal

Sir—We naturally have read with interest the coverage given the recent Yates Committee hearings in Washington by The IRON AGE in the May 12 issue. However, I do want to call your attention to an error with respect to Kaiser Aluminum.

The article specifically states that Kaiser has "so-called hot metal deals" and indicates also that a company spokesman had outlined its molten metal activities. This, of course, is completely in error as Kaiser does not have any hot metal contracts such as are held by both Alcoa and Reynolds.—Dudley T. Ross, manager, press section, Kaiser Aluminum & Chemical Corp., Oakland, Calif.

▪ **Our apologies.—Ed.**



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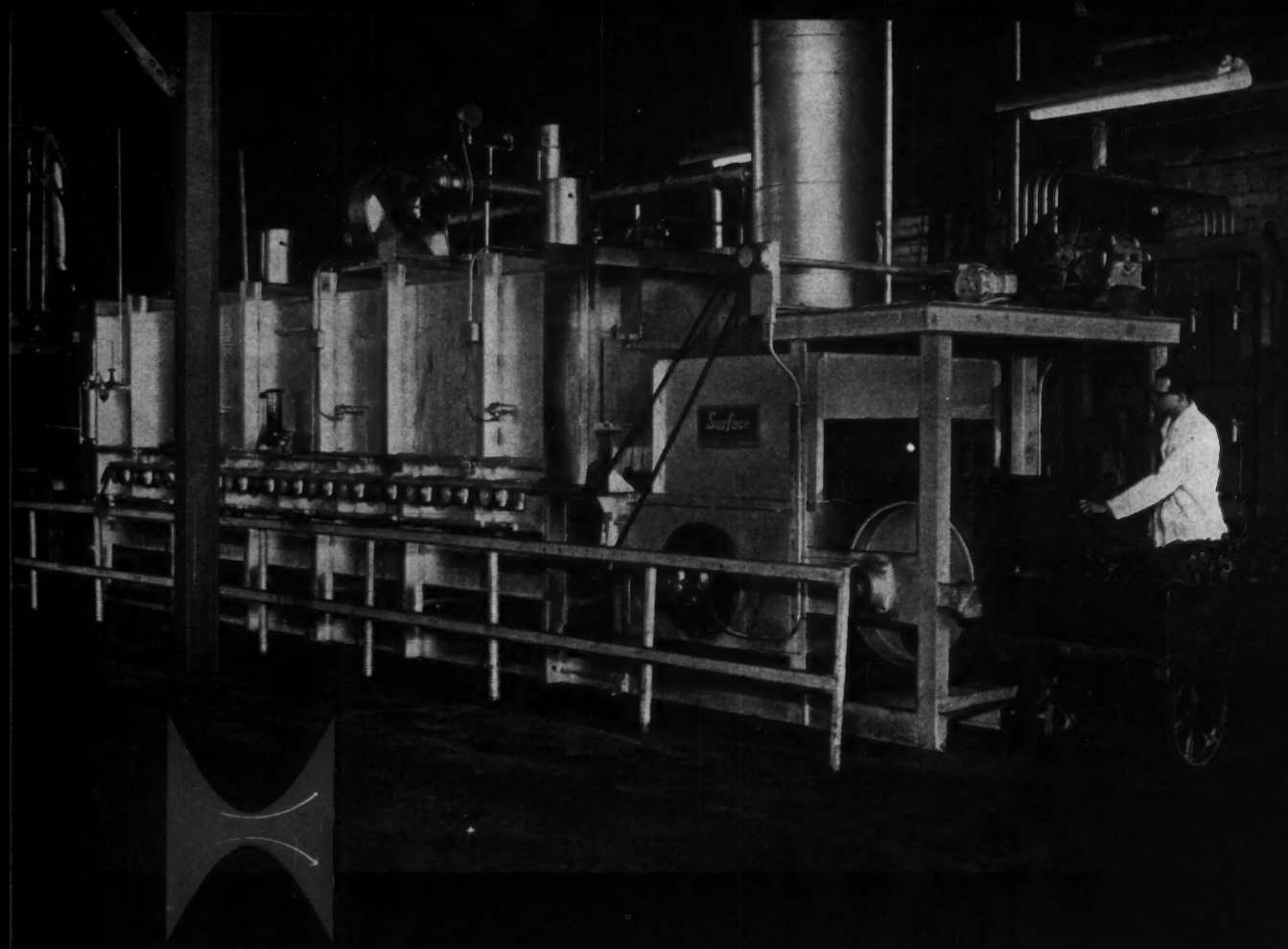


SURFACE POWER CONVECTION EQUIPMENT

cuts Ross Gear forging process time 50%

High speed, high volume air circulation is the feature of this Surface continuous draw furnace, which enabled Ross Gear and Tool Company, Lafayette, Indiana, to

(1) process a wide variety of steering gear forgings much faster than with the batch type furnaces replaced. These forgings range from a few ounces to 22 pounds.

(2) draw forgings at rates to keep up with production in hardening operations.

(3) reduce handling operations, consequently reassign personnel to more productive jobs.

The furnace has three separately controlled zones, each with its own burners and fan. The uniformity of furnace temperature from zone to zone is consistently held within ±5°F.

Mr. Leonard Ewalt, Chief Metallurgist of Ross Gear, reports: "The furnace will heat through a 2-inch section in approximately 40 minutes—just about as fast as the metal can take it when heated by convection . . . I would say that with this method of distributing heat in the zones and the rapid heating rate, this Power Convection furnace* is a couple of years ahead of its time.

We're not waiting for tomorrow, either. We're getting results today."

Write for bulletin SC-182. Surface Combustion, 2373 Dorr Street, Toledo 1, Ohio. In Canada: Surface Industrial Furnaces Ltd., Toronto, Ont.

*Trademark of Surface Combustion, Division of Midland-Ross Corp.

Surface

A division of Midland-Ross Corporation

MR

U-2 in Siberia

You don't become an expert on anything — including Russia — in three weeks. So in presenting a different slant on the U-2 affair (see p. 77) we're not trying to compete with the CIA.

But it is true that IRON AGE Editor George Sullivan spent several days in Sverdlovsk during the summer of '58. It was part of a 3-week, 8000-mile tour of the Soviet Union with an official U. S. delegation.

If Ever—It may be a long time before such exchange visits are again possible—but they give an insight obtainable in no other way.

Sverdlovsk, where the U-2 was "downed" on May 1, is a city of some 800,000 people in western Siberia. It has a passel of opera houses and culture palaces—wide streets, and perhaps four churches. The others have become museums —because "only the old folks go to church in the Soviet Union."

Nicholas II — It also boasts a good geological museum and an ore research lab staffed by 600. And it is the city, incidentally, where Czar Nicholas II and most of his family were assassinated.

Behind the Curtain

Do you wonder what the Russian metallurgists and scientists are doing? We don't know too much of what's going on in labs behind the Iron Curtain, but we know that right this minute they are probably reading about the latest news and technical developments in U. S. metalworking in the pages of The IRON AGE.

What gives us this idea? We just received a copy of a digested and translated article on stainless steel that appeared in The IRON AGE last year.

Sure Thing—When we printed the article, "AM-355: High Strength Stainless," by G. N. Aggen, metallurgist at the Allegheny Ludlum Steel Corp., Brackenridge, Pa., research laboratory, we knew it would be of interest and value to our readers. It told of good corrosion resistance with ease of fabrication.

And we weren't surprised to find that it proved interesting to the Russians. It isn't the first time that they've taken articles from The IRON AGE and translated them for readership among their metalworking experts.

With their fast growing steel industry, the need for knowledge of technological developments is mounting. And to get this knowledge they often turn to The IRON AGE.

But not only in the U. S. and Russia is The IRON AGE one of the leading journals read by industrialists and scientists.

In almost every nation of the world copies of the magazine are stocked in technical libraries. And reports say it is read from cover to cover eagerly and regularly.

What's Moo?

Stainless steel teeth (false, that is) for cattle. That's what.

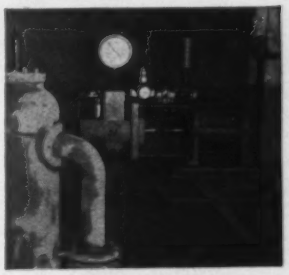
Ranchers in Nebraska found that the breeding life of cattle was shortened by wear on the enamel of the lowers. In fact, it got so bad that at times some of the bovines could not bear to drink (water) and couldn't crop grass.

But a cow named "Pearlie" helped solve the riddle. After a great deal of experimenting a dentist was able to cap her teeth with stainless steel crowns. And being faithful to her breed, "Pearlie" was able to gain 35 lb in 20 days because she had new pearly whites.

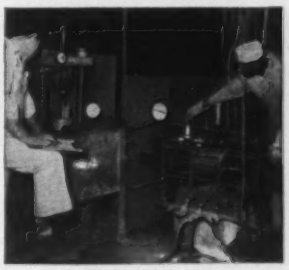
Now the teeth are on the market and already 10,000 cows have made appointments to stop in and see their friendly neighborhood dentists.

WANT RELIABLE HYDROSTATIC TESTING TO 50,000 PSI?

Aldrich Air-Driven Hydraulic Pumps are rugged, compact... the perfect answer for production or laboratory needs . . . Operate on normal plant air... Immediate shipment from factory stock.



FOR HIGH PRESSURE VESSELS—Maker of unfired pressure vessels tests production units with Aldrich air-driven hydraulic pump, in accordance with A.S.M.E. Boiler and Pressure Test Code.



OR CASTINGS—Castings and forgings for missile, nuclear, and other industries are tested in this rig on a production-line basis. Source of hydraulic pressure is an Aldrich pump. This unit has capacity of 12,100 psi. Other pumps available for pressures to 50,000 psi. Special units to 100,000 psi.

Aldrich air-driven hydraulic pumps are dependable, economical to operate and easy to install. Write today for Data Sheet 36 (6-inch stroke) or Data Sheet 36A (3-inch stroke).

ALDRICH

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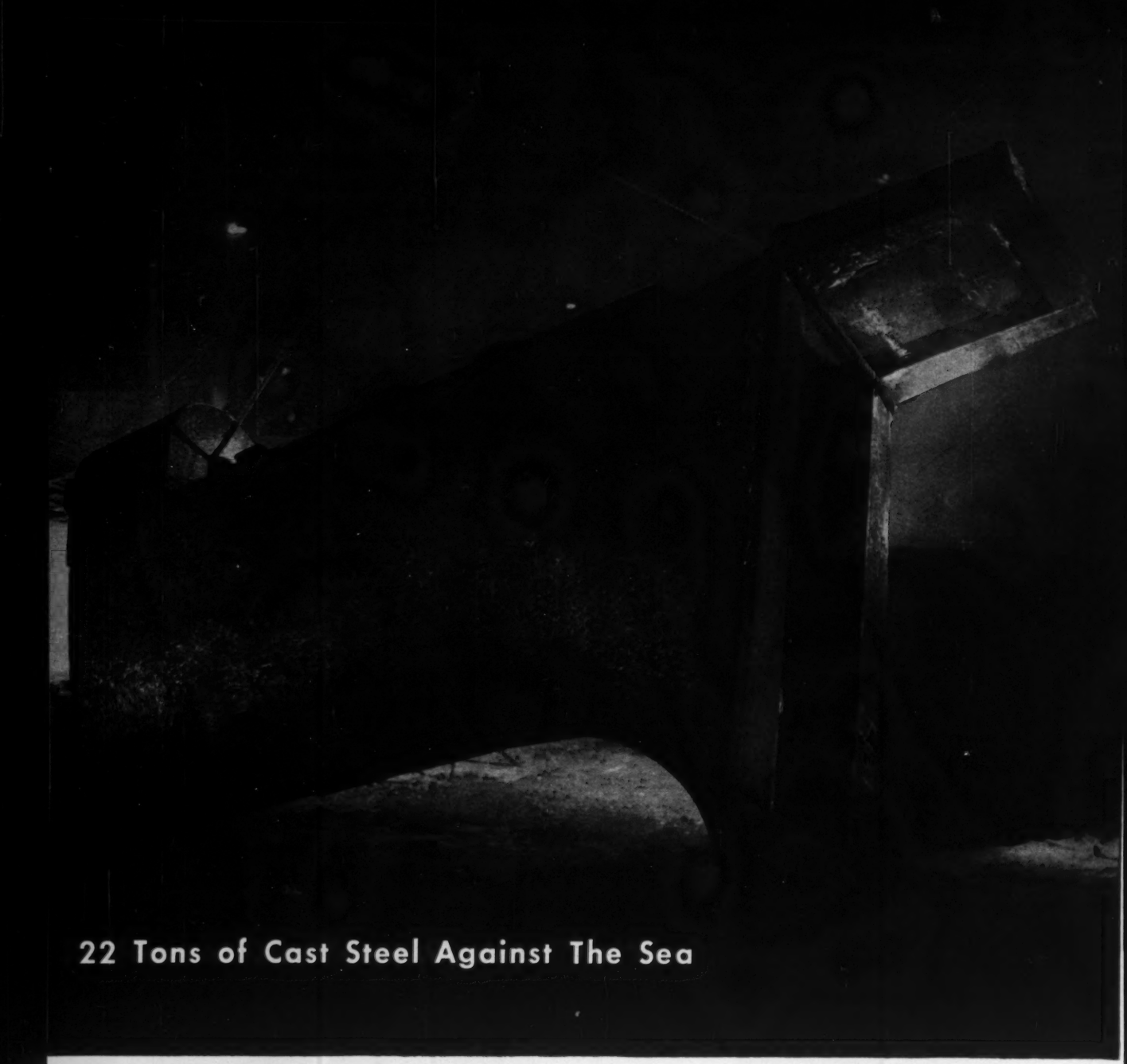
8 Pine Street, Allentown, Pa.



22 Tons of Cast Steel Against The Sea

ERIE FORGE & STEEL cast steel ship's stern frames meet and beat the stern challenges of the seven seas . . . steel castings bred and born to survive Neptune's furious tempers against maritime and naval shipping. Like the men who for centuries have mastered the sea, these cast steel components boast the rugged strength, the inborn quality to win the coveted "well done" on every voyage.

Casting and forging dependable ship's components and vital parts for industrial machines is a long-time habit at Erie Forge & Steel. A habit combining strict quality control from raw materials to finished casting, long experience in producing steel castings to exacting specifications, modern metallurgical, engineering and production methods . . . Procedures that assure the results you expect. Consult with us.

ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA

MEMBER AMERICAN IRON AND STEEL INSTITUTE

COMING EXHIBITS

Production Engineering Show — Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave. New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

Metal Show—Oct. 17-21, Convention Hall, Philadelphia. (American Society for Metals. Metals Park, Novelty, O.)

Die Casting Exposition & Congress —Nov. 8-11, Detroit Artillery Armory, Detroit. (The Society of Die Casting Engineers, 19382 James Couzens Highway, Detroit 35.)

MEETINGS

JUNE

Metal Powder Industries Federation —International powder metallurgy conference, June 13-15, Biltmore Hotel, New York. Headquarters, 60 East 42nd St., New York 17, N. Y.

Alloy Casting Institute — Annual meeting, June 19-21, The Homestead, Hot Springs, Va. Institute headquarters, 1001 Franklin Ave., Garden City, N. Y.

Industrial Safety Equipment Assn., Inc.—Annual meeting, June 21-24, Sedgefield Inn, Greensboro, N. C. Association headquarters, 420 Lexington Ave., New York.

Steel Tank Institute—Semi-annual meeting, June 23-24 Broadmoor, Colorado Springs, Colo. Institute headquarters, 120 S. LaSalle St., Chicago.

Drop Forging Assn.—Annual meeting of members, June 26 - 29, Seigniory Club, Canada. Association headquarters, 1121 Illuminating Bldg., Cleveland.

American Society for Testing Materials—Annual meeting and apparatus exhibit, June 26-July 1, Chalfonte-Haddon Hall, Atlantic City, N. J. Society headquarters, 1916 Race St., Philadelphia 3, Pa.

JULY

Truck Trailer Mfrs. Assn.—Annual summer meeting, July 10-13, The Homestead, Hot Springs, Va. Association headquarters, 710 Albee Bldg., Washington, D. C.

Cast Iron Pipe Research Assn.—Annual meeting, July 13-14, The Seaview Country Club, Absecon, N. J. Association headquarters, Prudential Plaza, Suite 3440, Chicago.

Metal Lath Mfrs. Assn.—Summer meeting, July 20-21, Carlton House, Pittsburgh. Association headquarters, Engineers Bldg., Cleveland.

American Electroplaters' Society—Annual convention, July 24-28, Statler Hotel, Los Angeles. Society headquarters, 445 Broad St., Newark, N. J.

SEPTEMBER

American Machine Tool Distributors Assn.—Annual meeting, Sept. 3-4, LaSalle Hotel, Chicago. Association headquarters, 1500 Massachusetts Ave., N. W., Washington 5, D. C.

Assn. of Lift Truck & Portable Elevator Mfrs.—Fall meeting, Sept. 12, The Cavalier Club, Virginia Beach, Va. Association headquarters, One Gateway Center, Pittsburgh 22, Pa.

Electronic Industries Assn. — Fall conference, Sept. 13-16, French Lick-Sheraton, French Lick, Ind. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

American Die Casting Institute—Annual meeting, Sept. 14-16, Edgewater Beach Hotel, Chicago. Institute headquarters, 366 Madison Ave., New York.

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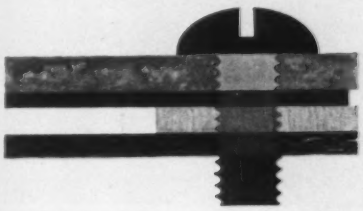
Tough Applications

Standardize 100% on

SOUTHERN fasteners



For every tough assignment in holding power, there is no substitute for threaded fasteners made with knowledge and experience gained through nearly 15 years of specialization in fasteners exclusively. This know-how can go to work for you on tough or conventional jobs, when you specify Southern Screws. That's why many industries have standardized 100% on Southern. Get in touch today with your local Southern Screw distributor, or write direct to Southern Screw Company, P. O. Box 1360, Statesville, North Carolina.

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YOU GET BIGGER SHAFTS IN THE SAME SPACE WHEN YOUR "SPECS" READ HYATT

To gain more space, simply eliminate the separable race from a Hyatt Hy-Roll bearing. For Hyatt rollers will operate directly on any shaft or bore that you've hardened and ground to bearing specifications. But, first be sure you're using Hy-Roll bearings. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

Replacement bearings available through United Motors System and its authorized bearing distributors.

HYATT HY-ROLL BEARINGS

IN ROLLER BEARINGS HYATT IS THE WORD FOR GM RELIABILITY

Steel

For Strength
. . . Economy
. . . Versatility

BETHLEHEM FLAT-ROLLED STEEL

. . . some like it thin

A 6-ft steel slat is rigid enough to assure smooth operation of venetian blinds.

Venetian blind manufacturers like their steel almost paper-thin. They also like it strong and springy; so much so that if it is bent or even tied into a knot it will snap right back without a permanent set!

Only steel can meet those requirements. And leading makers of handsome, durable venetian blinds are showing their preference for steel by using Bethlehem blackplate by the thousands of tons, not only for slats, but for head- and bottom-rails, too.

We can furnish blackplate and tinplate as thin as .008 in.; as wide as 36 in.; in cut lengths, and in coils several miles long! If you make blinds, or cans, or closures; boxes, buttons, or eyelets; signs, tags, toys or waste baskets . . . a Bethlehem tin-mill product might help make them better.

BETHLEHEM STEEL

BETHLEHEM STEEL

BETHLEHEM FLAT-ROLLED STEEL

...some like it thick

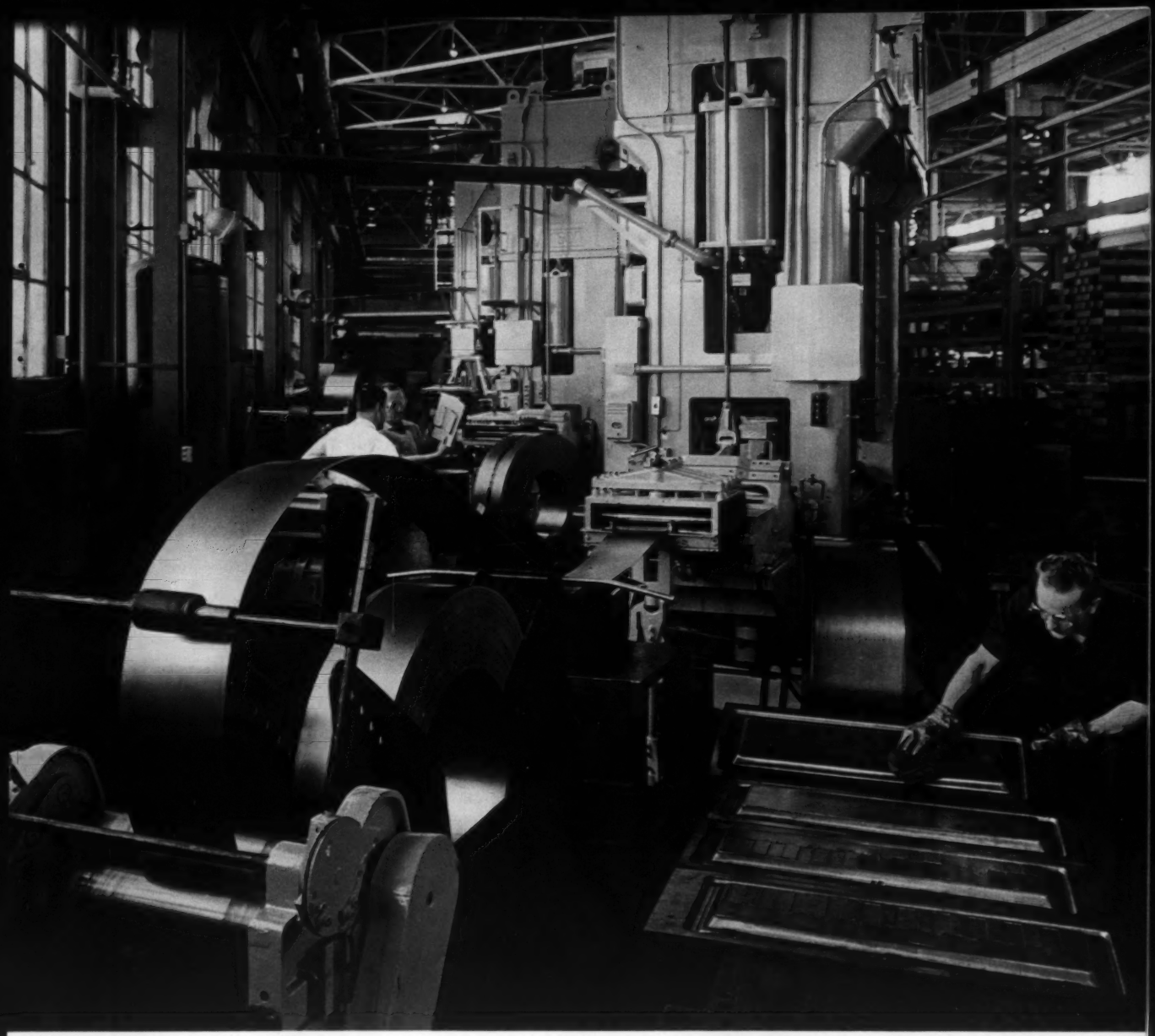
AS IN THIS GIANT TIRE-CURING PRESS

When your product is a hefty machine for curing rubber tires, such as this one being built at The McNeil Machine and Engineering Company, Akron, Ohio, you need your steel *thick*. McNeil uses Bethlehem steel plates in thicknesses up to $3\frac{3}{4}$-in.; Bethlehem can produce steel plates as thick as 15 in.

Bethlehem rolls plates in a full range of both sheared and universal mill sizes. Their uniformly high quality, together with proper welding techniques, result in sound welds every time. You can get full information from our nearest sales office; or use the coupon on page four of this advertisement.

Bethlehem engineers will help you with your steelworking problems

BETHLEHEM STEEL



...some like it in-between FOR HIGH-PRODUCTION STAMPING

This battery of presses at Federal Pacific Electric Company, Newark, N. J., includes one of 1,000 tons capacity—one of the largest in the electrical equipment industry. With its progressive dies, the giant press can stamp out complete enclosures at the rate of up to 20 per minute.

That's an impressive performance, both for the press and for the steel sheets. For their wide variety of needs, Bethlehem supplies Federal Pacific Electric with large tonnages of blue-ribbon sheets—hot-rolled, cold-rolled, and Bethcon continuously galvanized.

Our sheet mills at Sparrows Point, Md., and Lackawanna, N. Y., are equipped to turn out sheets in a wide range of gages, sizes, grades and surface finishes. If you work with steel sheets—in drawing, stamping, or simple bending—count on Bethlehem sheets for dependable performance.

BETHLEHEM STEEL

...do you roll your own?

YOU CAN GET THE FINEST HARDENED-STEEL ROLLS FROM BETHLEHEM

If you cold-roll steel sheet, strip, tinplate, blackplate, or non-ferrous metals, you can get the hardened-steel rolls you need from Bethlehem. We make them to your specifications for size, shape, hardness, finish. We can fit the smallest mill as well as the largest.

Hardened-steel rolls have long been a Bethlehem specialty. Our facilities are unsurpassed, and you can count on us for good delivery. Try us next time you need rolls.

STEEL

is strong... economical ...versatile

Here's a partial list of steels and specialty products in the Bethlehem line:

BARS AND BILLETS:
Carbon and alloy AISI grades
Concrete reinforcing bars
Leaded steels
Special rolled sections

TOOL STEELS:
Water, oil, and air-hardening grades

ROD AND WIRE:
General and special-purpose types
Fine and shaped wire

FORGINGS:
Drop, press, hammer, and upsetter
Rolled-and-forged sections

SHEETS:
Hot- and cold-rolled
Continuously galvanized
Enameling sheets

TIN MILL PRODUCTS:
Electrolytic and hot-dip tinplate; blackplate

PLATES:
Universal and sheared
Flanged and Dished Heads

FASTENERS:
Bolts, cap screws, rivets
Special fasteners

STEEL PIPE:
Continuous butt-weld
Electric resistance-weld

STRUCTURAL SHAPES

COLD-FORMED SHAPES

PALLET RACKS

WELDMENTS:
Frames, tanks, housings, vessels

FREIGHT CARS, PARTS, WHEELS, AXLES

WIRE ROPE AND SLINGS

RAILS:
Tee, crane, girder

CASTINGS:
Carbon, alloy, and stainless steel
Iron, brass, bronze

...AND BETHLEHEM MAKES IT IN NEARLY EVERY FORM

ROOM 1041,
BETHLEHEM STEEL COMPANY,
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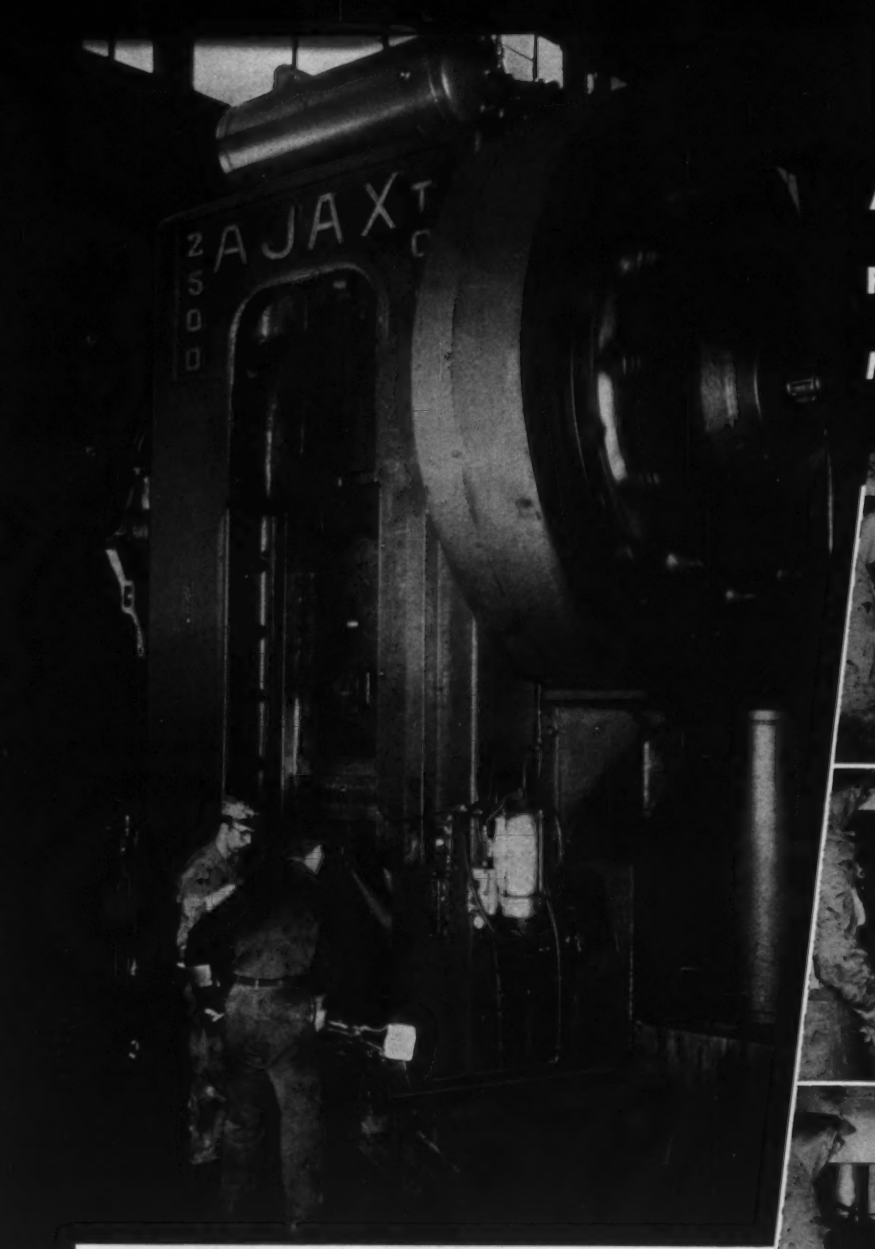
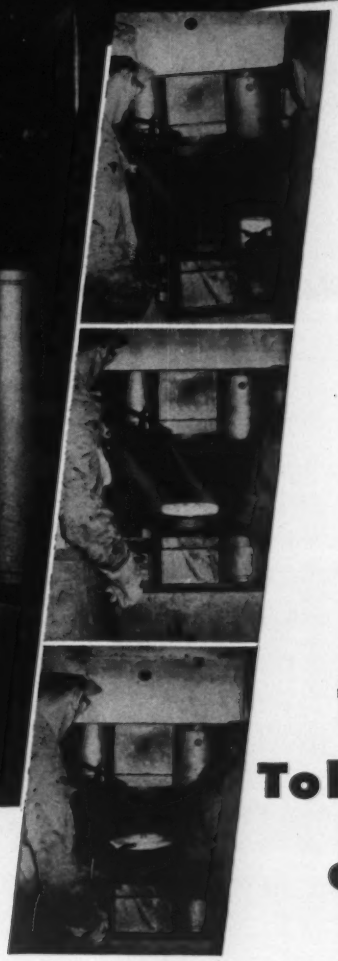
BETHLEHEM STEEL

BETHLEHEM STEEL



ACCURATE PRESS FORGINGS REDUCE MACHINING COSTS



JACKSON DROP FORGE CO., JACKSON, MICHIGAN

Progressive Multi-stage Forgings as shown above are Forged in one heat with less draft on AJAX Forging Presses. Machining is reduced to a minimum for a saving in both time and material.

Powerful AJAX Presses are fast operating and well-aligned—built with a solid steel frame in sizes 300 ton to 8000 ton capacity.

There is an AJAX Press to fit your particular Forging requirements . . .

Write for Bulletin 75C

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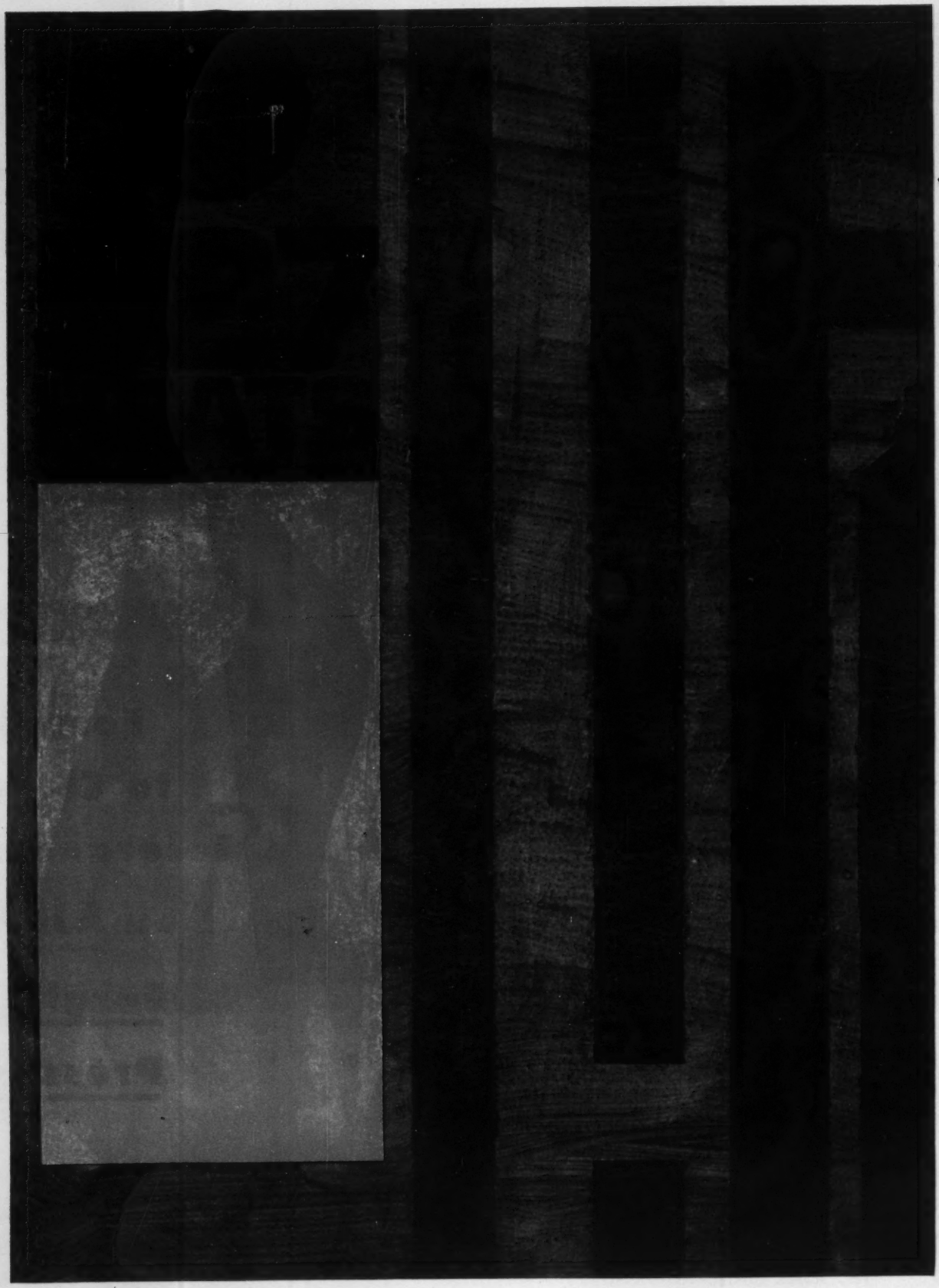
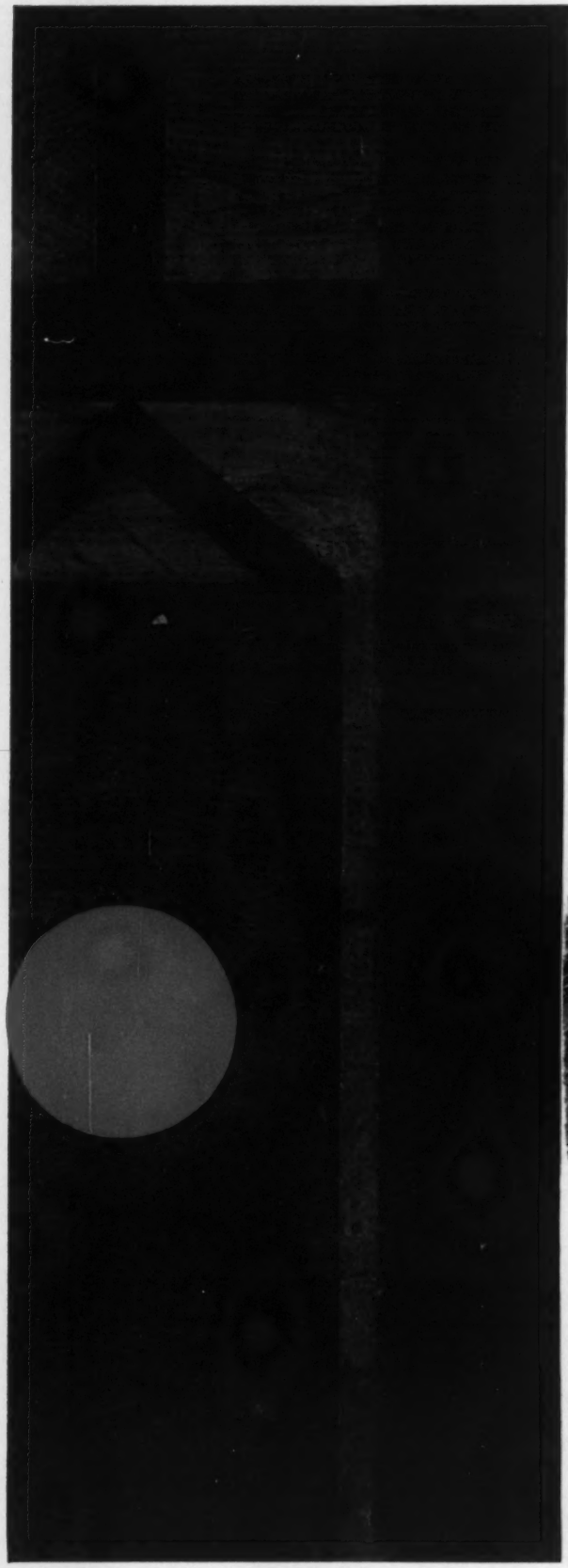




. . . . ANOTHER RECORD FOR FOUNDRY OPEN HEARTH BOTTOM PERFORMANCE USING PERMANENTE 165 RAMMING MIX

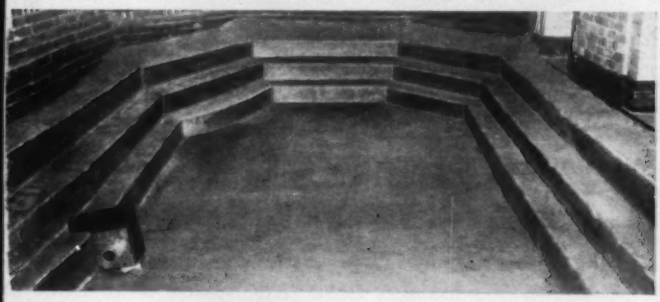
This outstanding performance record was recently established in the #7 furnace at General Steel Castings after switching to Permanente 165 for the foundry open hearth furnace bottom. The heats average 50-60 tons in the 80-ton capacity furnace. Normal fettling time is 20 minutes.

The furnace normally makes three types of steel: armor grade, Grade "A" (1020 steel) and nickel. With the Permanente 165 bottom, one type is made right after another without notable pickup of undesirable elements.

EXCEPTIONAL PERFORMANCE IS THE RULE

Operators who have switched to Permanente 165 Ramming Mix consistently report exceptional performance—whether for furnace bottoms, for new tapholes or for hot tapholes. Permanente 165 is made from high purity Kaiser Periclase refractory grains (95-96% MgO) and ceramically bonds itself into a crystalline mass at relatively low temperature—providing fast furnace availability.

This monolithic structure has exceptional volume stability, maximum resistance to hydration and to attack by iron oxide and slag. For furnace bottoms, its high density (averaging 175 pounds per cubic foot after firing) assures longer life. Make your own test and see how much more service you get with Permanente 165 Ramming Mix. Your Kaiser Refractories representative will be glad to help.



New Permanente 165 bottom in #7 O.H. furnace at the Granite City, Illinois, plant of General Steel Castings Corporation.

KAISER REFRACTORIES

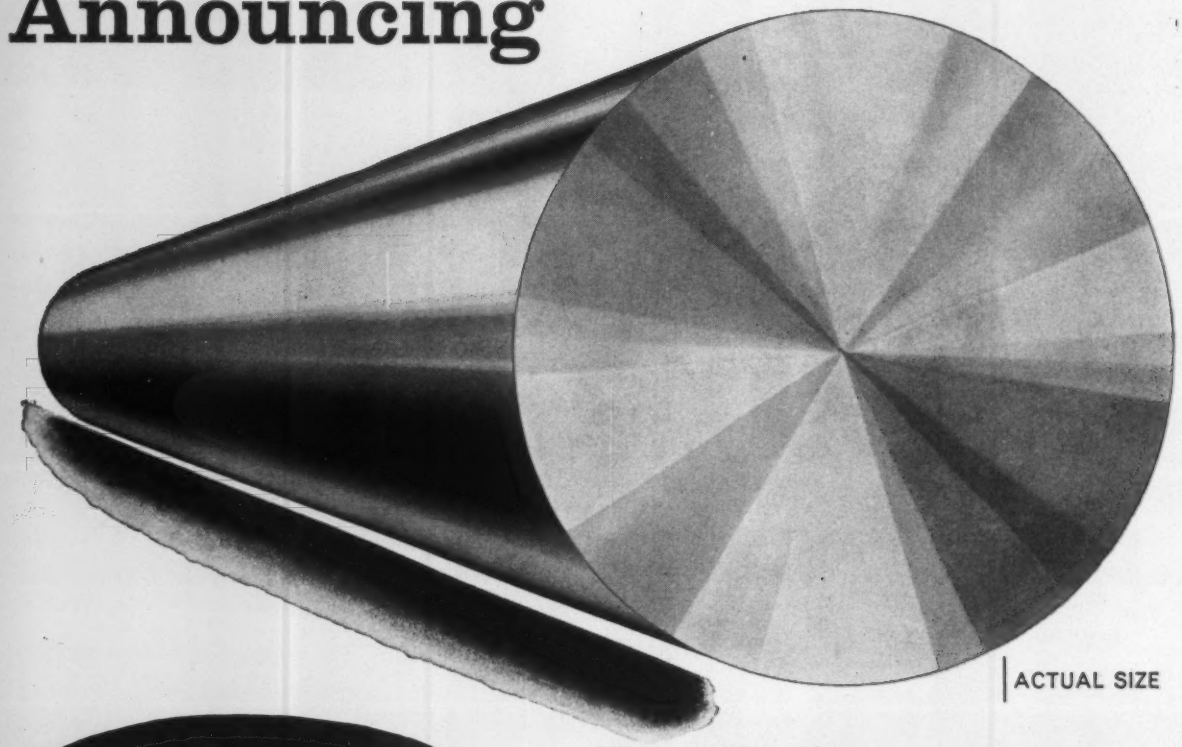
Mexico Refractories Company Now Merged with Kaiser Refractories

Call or write Kaiser Refractories & Chemicals Division, Kaiser Aluminum & Chemical Sales, Inc., at any of the offices listed below:

PITTSBURGH 22, PA. . . . . 3 Gateway Center
MEXICO, MISSOURI . . . . . Mex-R-Co Building
OAKLAND 12, CALIF. . . . . 300 Lakeside Drive

Ask to see the 30-minute color movie, "Progress in Modern Basic Refractories." Arrangements will be made by your Kaiser Refractories Sales Representative or Regional Office.

Announcing



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STRESSPROOF®
STEEL BARS
WITH COPPER

In Diameters Through 4"

Five new sizes: 4", 3⅞", 3¾", 3⅝", 3½".

Same high strength as smaller diameters... 100,000 psi yield.

Fast machining... 83% of B1112.

Cost less than heat treated in-the-bar alloys.

Ideal for both production *and* maintenance applications.

No heat treating necessary

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FOR FAST, ACCURATE AND ECONOMICAL
PRODUCTION CUT-OFF SAWING

it's important

THAT YOU INVESTIGATE . . . AND
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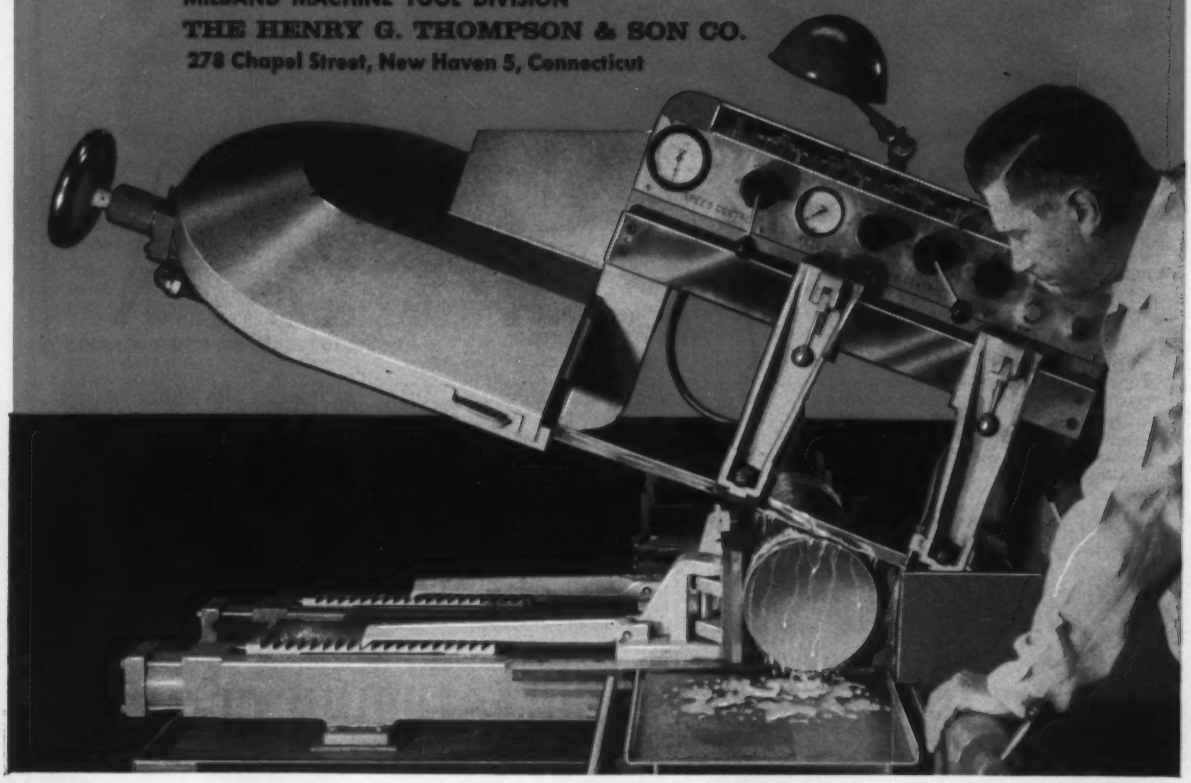
HORIZONTAL BAND SAW MACHINE

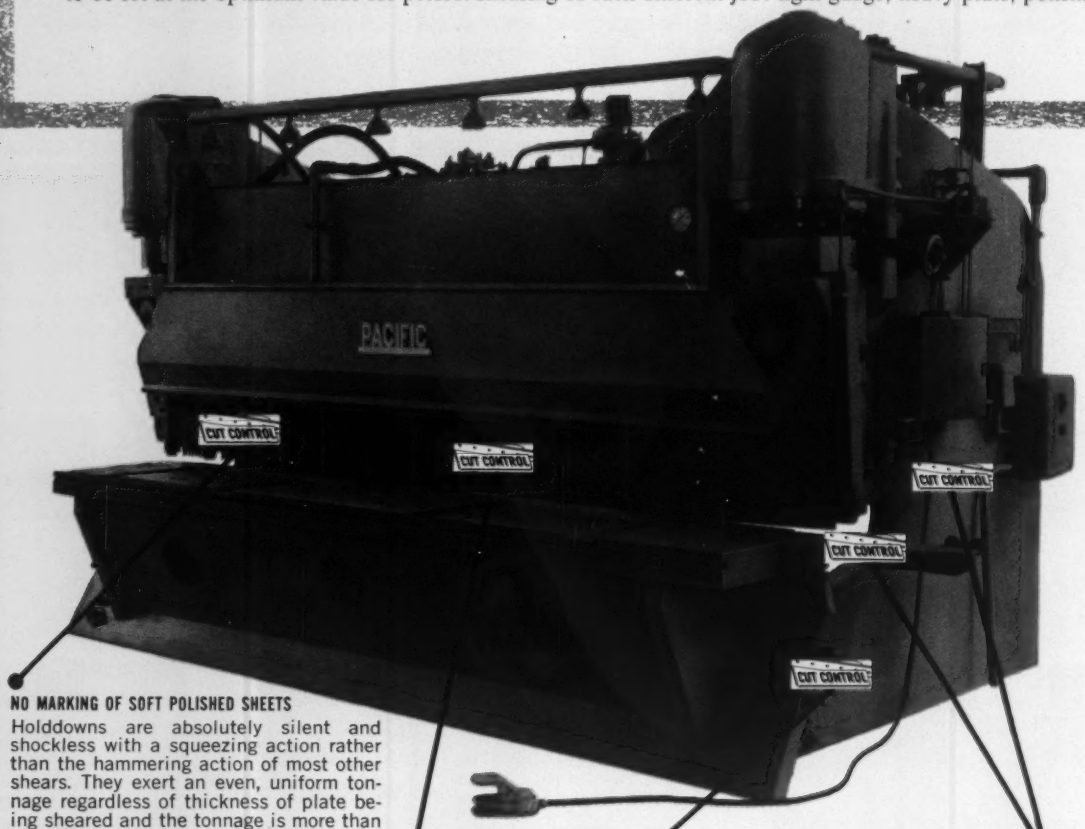
. . . a machine tool designed and built specifically for maximum efficiency and full blade life, using high speed steel band saw blades. Until you've actually seen this machine in action, you can't fully appreciate its ability to speed your cut-off production sawing and reduce your per-cut costs. Write for illustrated Milband fact folder.
Ask for a demonstration.

MILBAND MACHINE TOOL DIVISION
THE HENRY G. THOMPSON & SON CO.
278 Chapel Street, New Haven 5, Connecticut



CUT CONTROL adjustments to do jobs that

Unlike conventional shears that are limited in their shearing ability because they are permanently set without possible adjustment, PACIFIC features *Cut Control*—a group of adjustments which permit all controls to be set at the optimum value for perfect shearing of each different job: light gauge, heavy plate, polished



NO MARKING OF SOFT POLISHED SHEETS

Holddowns are absolutely silent and shockless with a squeezing action rather than the hammering action of most other shears. They exert an even, uniform tonnage regardless of thickness of plate being sheared and the tonnage is more than any other shear.

"INSURED" POSITIONING OF PLATES

For precision shearing, holddowns advance and positively grip plate independently of upper knife movement allowing operator to check for exact alignment (with aid of cut illumination) before shearing. All cuts are good cuts with PACIFIC.

LIGHT GAUGE SHEARING WITH HEAVY PLATE SHEAR

Knife clearance can quickly be adjusted over twice the range of any other shear so that PACIFIC can quickly be changed to cut either light gauge or heavy plate.

READILY SET UP FOR SLITTING

Depth of stroke readily adjusted so knives do not completely cross in slitting. This permits plates to be lined up with slitting attachment. Deep throats permit wide strips to be slit.

"CUSHIONED" SHEARING OF BRITTLE ALLOYS—Hydraulic power exerts smooth uniform shearing force cushioned against initial cutting shock and break-through shock. Rake angle readily adjusted for optimum setting to minimize or eliminate shock • HEAVIEST DUTY SHEAR—PACIFIC is designed for heavy duty continuous mill type service. It has more holddown tonnage, more horsepower and more weight in the actual stress bearing frame than any other shear. Customers report cutting full capacity stainless steel regularly • SAFEST SHEAR—Hydraulic system completely protected against deliberate or accidental overload. Shearing action can be stopped instantly in emergency by operator releasing foot pedal • LONGEST KNIFE LIFE—Customers report from 3 to 8 times longer knife life than mechanical shears. Knives cushioned against

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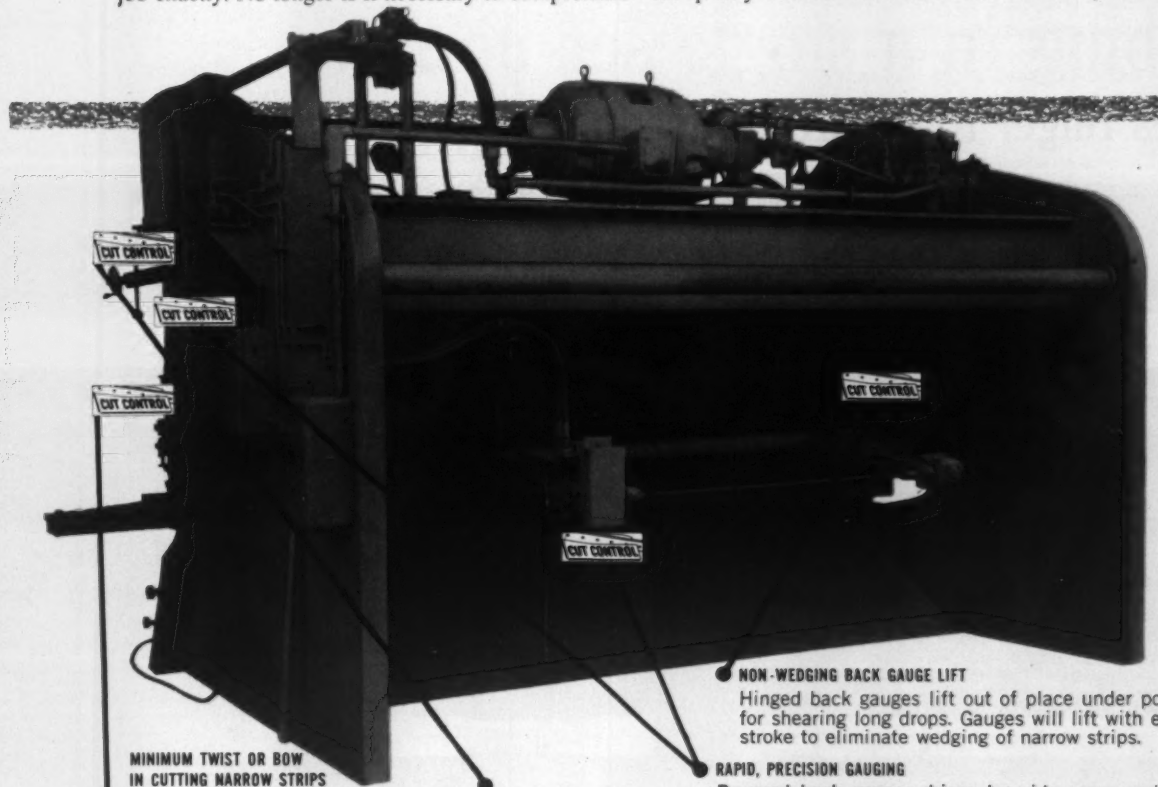
enable PACIFIC Hydraulic Shear are impossible on any other shear

stainless, soft aluminum, brittle alloys, long narrow strips, high speed cycling for high production, extreme accuracy for precision work, perfect mark-free edges. For the first time a shear can be controlled to fit the job exactly. No longer is it necessary to compromise with quality because the shear cannot be adjusted.



NON-WEDGING BACK GAUGE LIFT

Hinged back gauges lift out of place under power for shearing long drops. Gauges will lift with each stroke to eliminate wedging of narrow strips.

MINIMUM TWIST OR BOW IN CUTTING NARROW STRIPS

Rake angle can be readily adjusted to minimize or eliminate twist and bow in light materials. Even full capacity plate can be sheared at less rake angle than on other shears.

RAPID, PRECISION GAUGING

Powered back gauges driven by wide range variable speed hydraulic motor for rapid positioning with smooth deceleration to precise inching speed. Anti-friction ball screws; heavy single gauging bar; powered gauges controlled and indicated from front of shear.

HIGH CYCLING SPEED FOR HIGH PRODUCTION

PACIFIC has been designed to cycle as fast as an operator can feed it. Lineal speed of the ram has been selected at the optimum speed for maximum knife life and safety. Cycling speed is attained by shortening the stroke to the minimum permissible for each job thereby eliminating all wasted motion. In light gauge shearing of full length pieces, rake angle may also be reduced to further shorten the required stroke. In shearing small pieces or sheets that are less than the full length of the shear, the stroke can be shortened to the length of the sheet so that the upper knife returns upward immediately after completing the cut. Light strips can be sheared at rates up to 70 strokes per minute.

shock, protected against overload, uniform shearing speed through cut • NOISELESS OPERATION, QUIETER THAN A SEWING MACHINE—By completely eliminating usual loud, shattering noise through cushioned shockless shearing, PACIFIC has promoted measurable increase in efficiency of plant and office workers. No interference with adjacent electronic burning and gauging equipment • LOWEST MAINTENANCE—No wearing parts such as clutches, gears, bearings, brakes. All moving parts run in filtered oil. Only maintenance items are a few standard solenoids, relays, microswitches and yearly oil changes • HUNDREDS OF DOLLARS OF SAVINGS IN FOUNDATION COST—Foundation required to resist only dead weight and insure proper line-up. It need not resist heavy shocks, hammering and twisting of mechanical shear.

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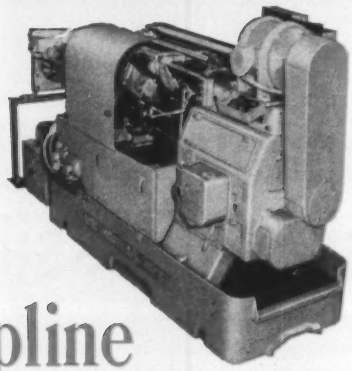
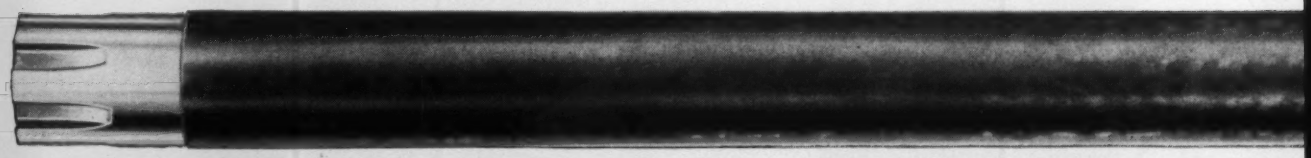
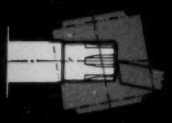


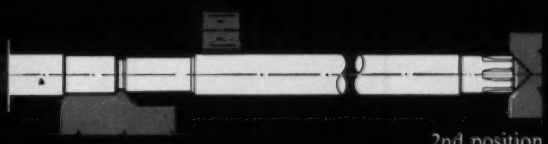
Acme-Gridley performs spline hobbing in a single set-up . . .

slashes ringer roll shaft production time 63%!

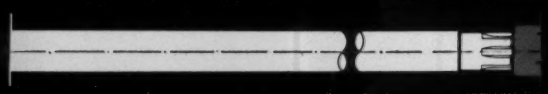




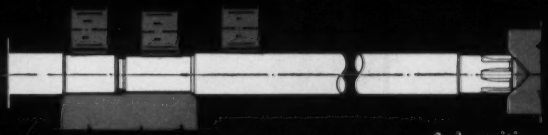
5th position
Hob Spline—Face Front (spindle clutch disengaged, spindle driven from hobbing attachment)



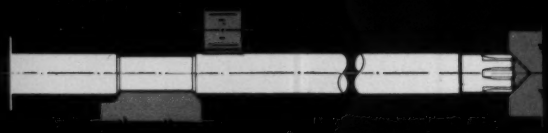
2nd position
Form Spline Dia. of Next Piece and Breakdown for Cut-off—Support



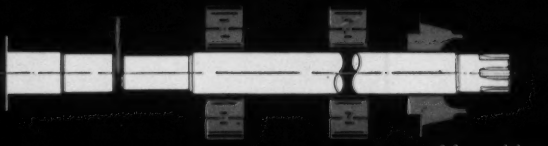
6th position
Feed Stock



3rd position
Shave Rear Dia. and Spline Dia.—Support



1st position
Form Rear Dia. Past Cut-off—Support



4th position
Support—Pick-up—Cut-off

6 Operations in 27.9 Seconds

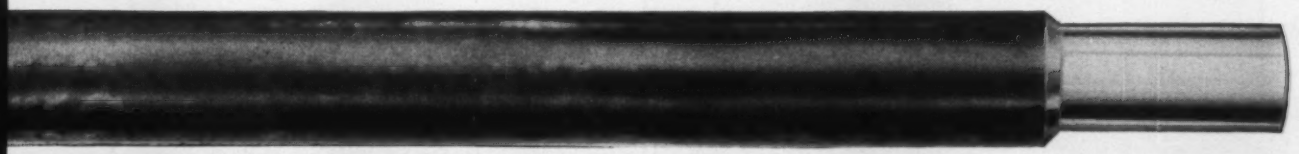
Here's how imaginative National Acme solutions to tough machining problems extend total machine capability and pay off in *tangible* production savings.

Spline hobbing is generally considered beyond automatic bar machine capability. Yet, an ingenious National Acme hobbing attachment . . . installed on an Acme-Gridley 1¼″ RA-6 with modifications . . . lets a well-known manufacturer of ringer roll shafts do spline hobbing in the primary set-up; has cut per-piece production time 63%. In addition, a unique automatic feeding arrangement has drastically reduced stock-loading downtime.

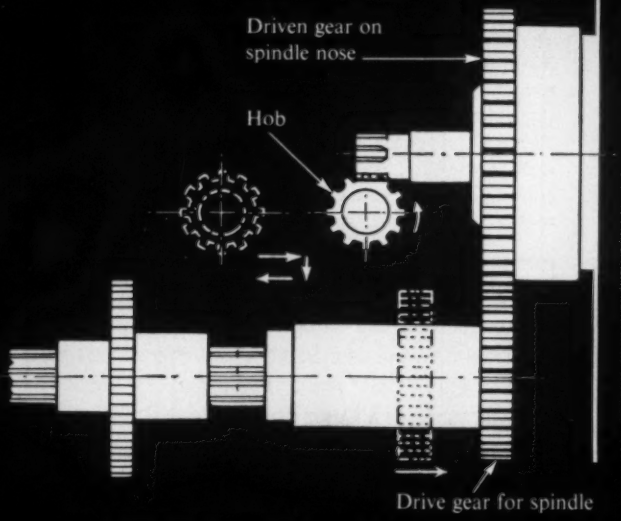
Special attachments like the spline hobber, plus such standard features as direct camming, independently operated toolslides, and a wide open tooling zone are the reason Acme-Gridley capability is limited by imagination only. No wonder cost-conscious manufacturers everywhere depend on Acme-Gridleys for higher mass production efficiency at lower cost. Detailed information on the world's most complete line of multiple and single-spindle automatic bar and chucking machines is yours for the asking. Call, write or wire.

National Acme's "Zone of Responsibility" includes all phases of cost reduction. Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by thousands of manufacturers . . . an "everyday" job for Acme-Gridleys. **Indirect Costs:** effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc. **Product Redesign:** teaming with your design group to take full advantage of Acme-Gridley's cost reducing capabilities. **Direct Material Costs:** our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems. **Make-or-Buy Reviews:** in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment. **Spot Modernization:** pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.



Spline hobbing in the fifth position . . . a closer look



When the hobbing attachment advances, a gear on the attachment engages a gear on the spindle nose and drives the spindle at the required speed for hobbing.

MMT-PE — Modern Machine Tools — Production Efficiency

National Acme

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Sales Offices: Newark 2, N. J., Chicago 6, Ill., Detroit 27, Mich.

CORROSION PROBLEMS:

can moly metal's resistance to mineral acids solve them for you?

The following tables show molybdenum's resistance to corrosion by mineral acids, providing oxidizing agents are not present. They also indicate molybdenum's superiority to conventional materials used in handling these acids.

hydrochloric acid

% HCl	temperature, F	aerated	corrosion rate, mils/year* unalloyed molybdenum	14% Si – 3% Mo iron	70% Ni – 30% Mo alloy
5	room	yes (air)	0.40	–	7.8
		yes (oxygen)	0.27	–	–
	160	no	1.1	18.	13.
		yes (oxygen)	1.4	17. (air)	25. (air)
	boiling	no	3.6	79.	13.
20	room	yes (air)	0.10	–	3.1
	160	no	0.58	35.	9.2
		yes (oxygen)	1.4	53. (air)	24. (air)
	boiling	no	0.90	230.	27.
37	room	yes (air)	0.16	–	1.6

*average of five 48-hr periods

hydrofluoric acid

% HF	temperature, F	aerated	corrosion rate, mils/year* unalloyed molybdenum	70% Cu – 30% Ni alloy
25	room	no	0.13	2.6
		yes (air)	0.22	–
	212	no	3.1	55.
		yes (air)	20.	–
49	room	no	0.14	4.1
		yes (air)	0.08	–
	212	no	2.3	75.
		yes (air)	16.	–

*average of five 48-hr periods

phosphoric acid

%H_3PO_4	temperature, F	aerated	corrosion rate, mils/year* unalloyed molybdenum	type 316 stainless steel	70% Ni – 30% Mo alloy
10	room	yes (air)	0.27	nil to 0.18** (oxygen)	1.7
	212	no	2.4	nil to 0.18**	24.
	boiling	no	1.3	nil to 6.7**	19.
50	room	yes (air)	0.25	nil to 0.06** (oxygen)	0.40
	212	no	1.5	1.7	2.5
	boiling	no	1.5	5.4	7.1
85	room	yes (air)	0.20	nil to 0.80** (oxygen)	0.16
	212	no	0.29	20.	0.83
	boiling	no	1.4	770.***	1.9

*average of five 48-hr periods
**range of five 48-hr periods
***one 48-hr period only

sulfuric acid

%H_2SO_4	temperature, F	aerated	corrosion rate, mils/year* unalloyed molybdenum	14% Si iron	14% Si – 3% Mo iron
10	160	yes (nitrogen)	0.22	–	–
		yes (air)	1.4	–	–
		yes (oxygen)	nil to 9.1**	–	–
	boiling	no	6.6	–	–
	400	no	0.77	–	–
20	160	yes (nitrogen)	0.18	–	–
		yes (air)	0.82	–	–
		yes (oxygen)	nil to 3.4**	–	–
	400	no	3.7	–	–
40	160	no	0.74	11.	2.9
		yes (air)	nil to 0.90**	10.0	–
		yes (oxygen)	nil to 1.4**	–	–
	boiling	no	1.5	14.	6.7
50	160	no	0.52	3.4	0.36
		yes (air)	nil to 0.52**	2.3	–
	boiling	no	2.5	5.9	1.6
75	160	no	0.70	0.13	0.20
		yes (air)	nil to 0.15**	nil	–
	boiling	no	34.	0.26	0.68
95	160	no	0.12	0.02	0.28
		yes (air)	nil to 0.21**	0.36	–
	boiling	no	dissolved	–	–

*average of five 48-hr periods
**range of five 48-hr periods

Molybdenum also offers good long-term resistance to attack by liquid metals up to the temperatures given: bismuth (2600 F), gallium (570 F), lead (2190 F), lithium (1650 F), magnesium (1290 F), mercury (1110 F), potassium (1650 F), sodium (liquid and vapor) (1650 F), sulfur (825 F) – and a number of alloys of these and other metals.

FORGING BILLETS OF CLIMELT MOLYBDENUM METALS AND CLIMELT MOLYBDENUM-BASE ALLOYS ARE NOW PROMPTLY AVAILABLE IN STANDARD STOCK SIZES OF 4⅛", 5½", 6", 6½" AND 7" DIAMETERS. BAR STOCK IS MAINTAINED IN A RANGE OF SIZES UP TO 4" DIAMETER.

For complete data, send for these free manuals: "Corrosion Resistance of Molybdenum and Molybdenum-Base Alloys" (24 pages), "Molybdenum Metals" (110 pages), and "Climelt Molybdenum and Molybdenum-Base Alloys" (24 pages). Write:

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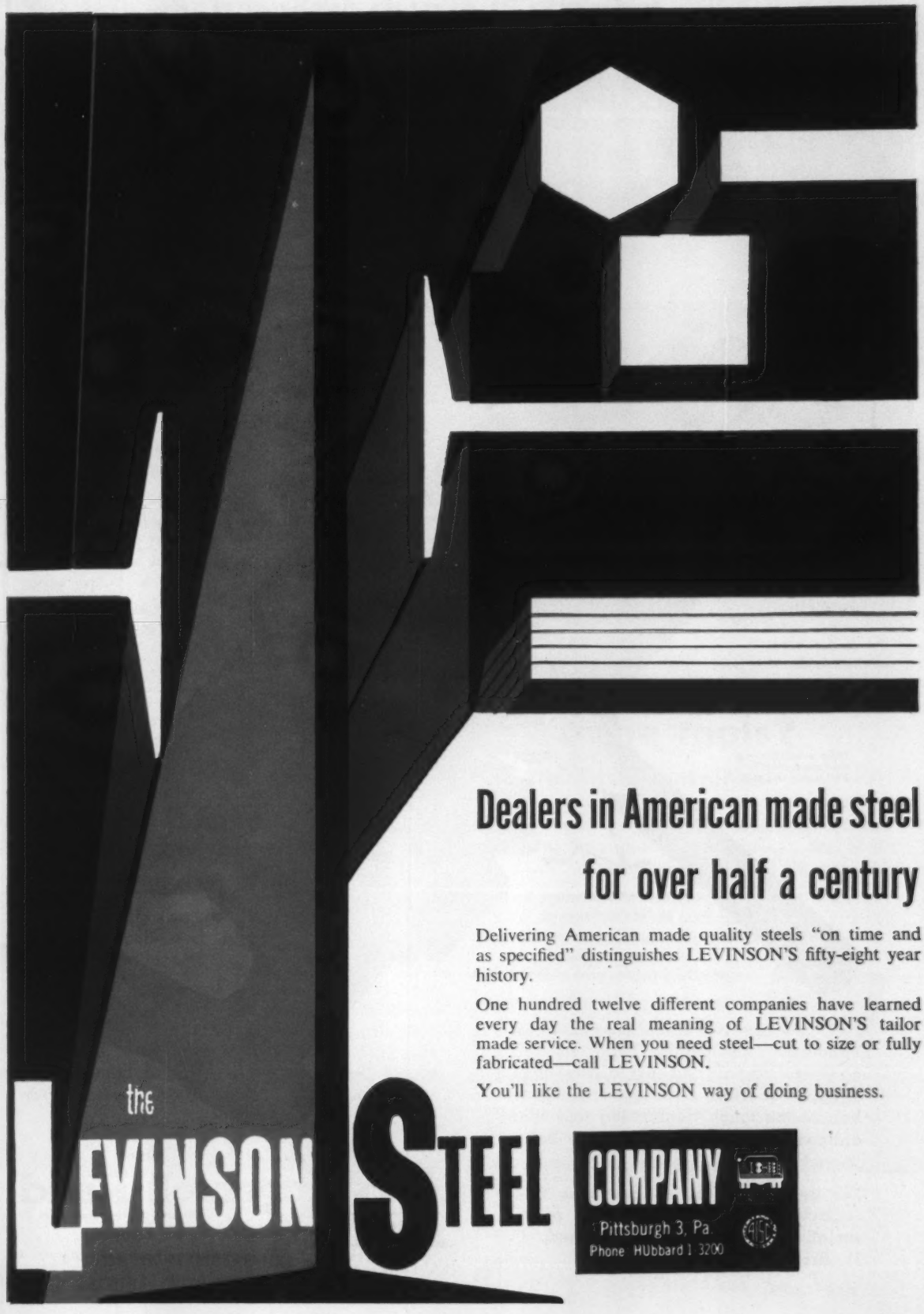

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NEW ... the most powerful IMPACTOOL you can hold in two hands!

20% More Power
from improved 6-vane motor with specially ground cylinder and oversize vanes.

75% Faster Rundown
new impact mechanism handles the toughest jobs easily.

NEW SIZE 844 IMPACTOOL
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Optional—Square Drive (1¼" across flats)

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sockets can't fall off accidentally but retainer pin can be easily replaced if necessary.

1⅜" Shorter
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(Also available with side spade handle and inside trigger)

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for individual servicing of either the motor "pack" or impact mechanism "pack".

I-R's new Size 844 is the most powerful hand-held, one-operator Impactool you can buy. Compact and easy to use even in cramped quarters, it is rugged enough to handle the tough nut-running jobs that ordinarily require two men and a bulky impact wrench.

For details on the all-new Size 844 Impactool, call your nearby I-R representative. Or write: Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

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Without obligation, please send your Bulletin 1173 with details regarding leasing and extended payment plans.

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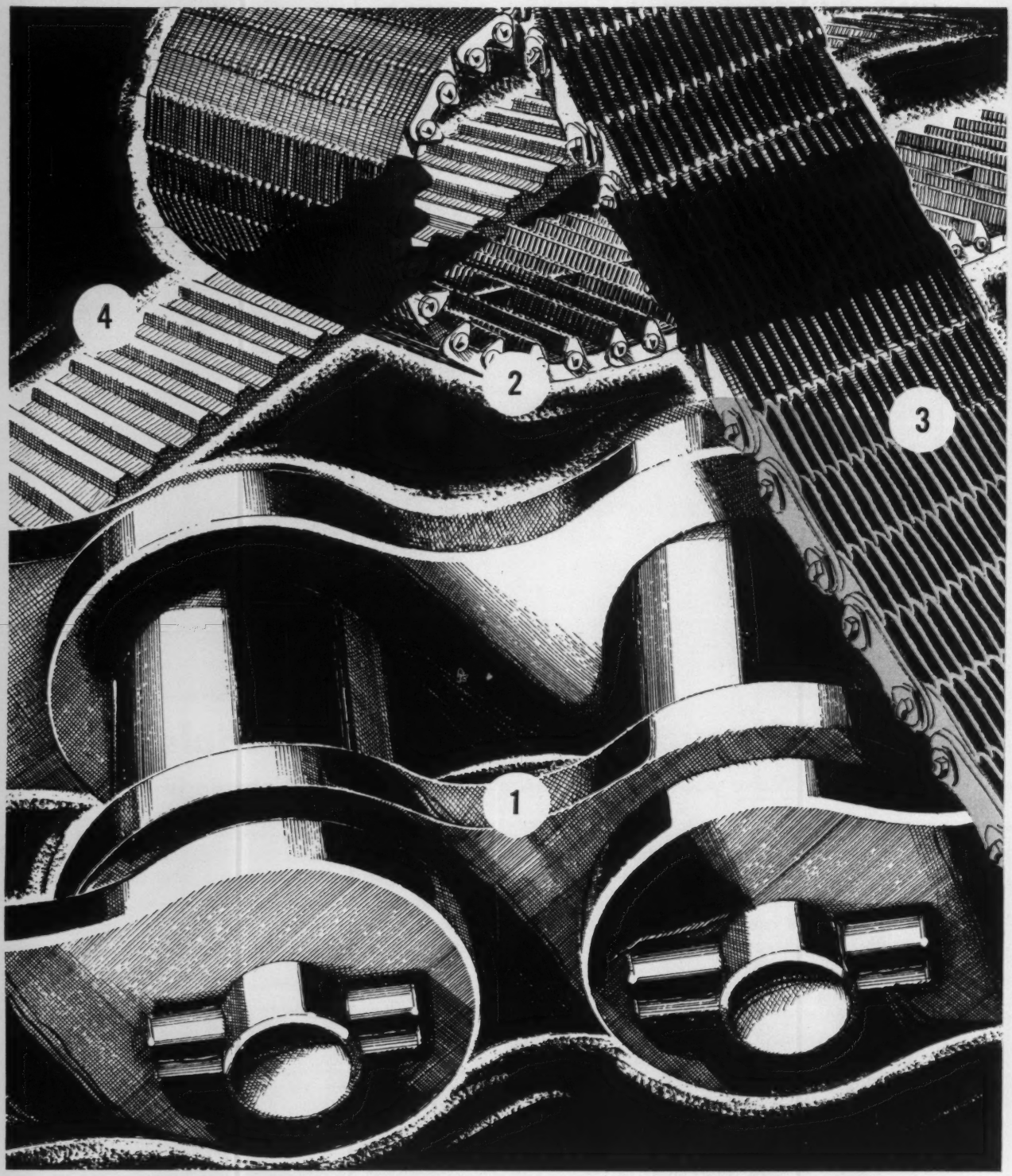

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For low- and medium-speed applications. Precision-finished, specially treated to withstand shock and fatigue . . . lasts longer.

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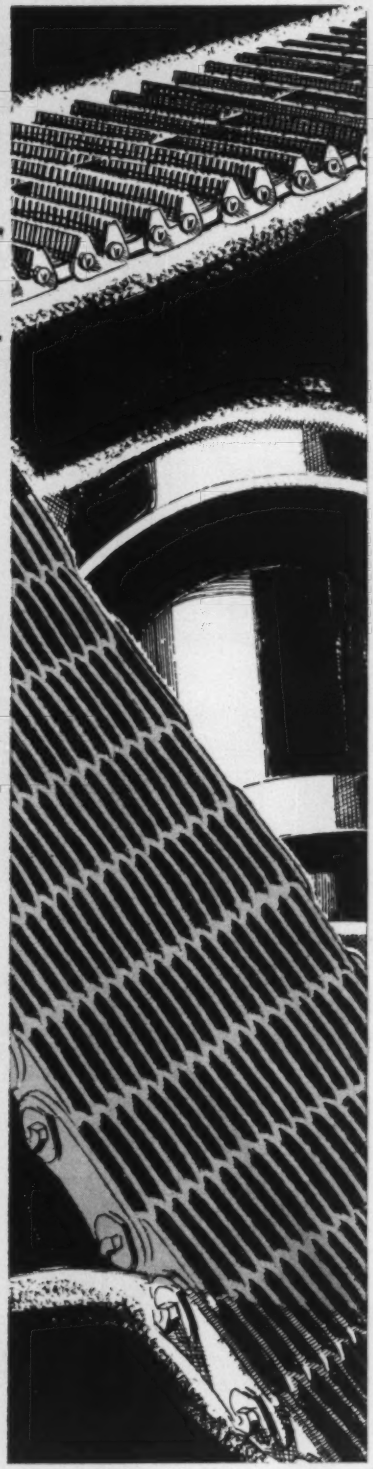

Only Morse offers all 4... only Morse can offer

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Roller Chain, Silent Chain, Hy-Vo Drives and "Timing" Belts...Morse offers them all: Morse has no axe to grind for any one of them

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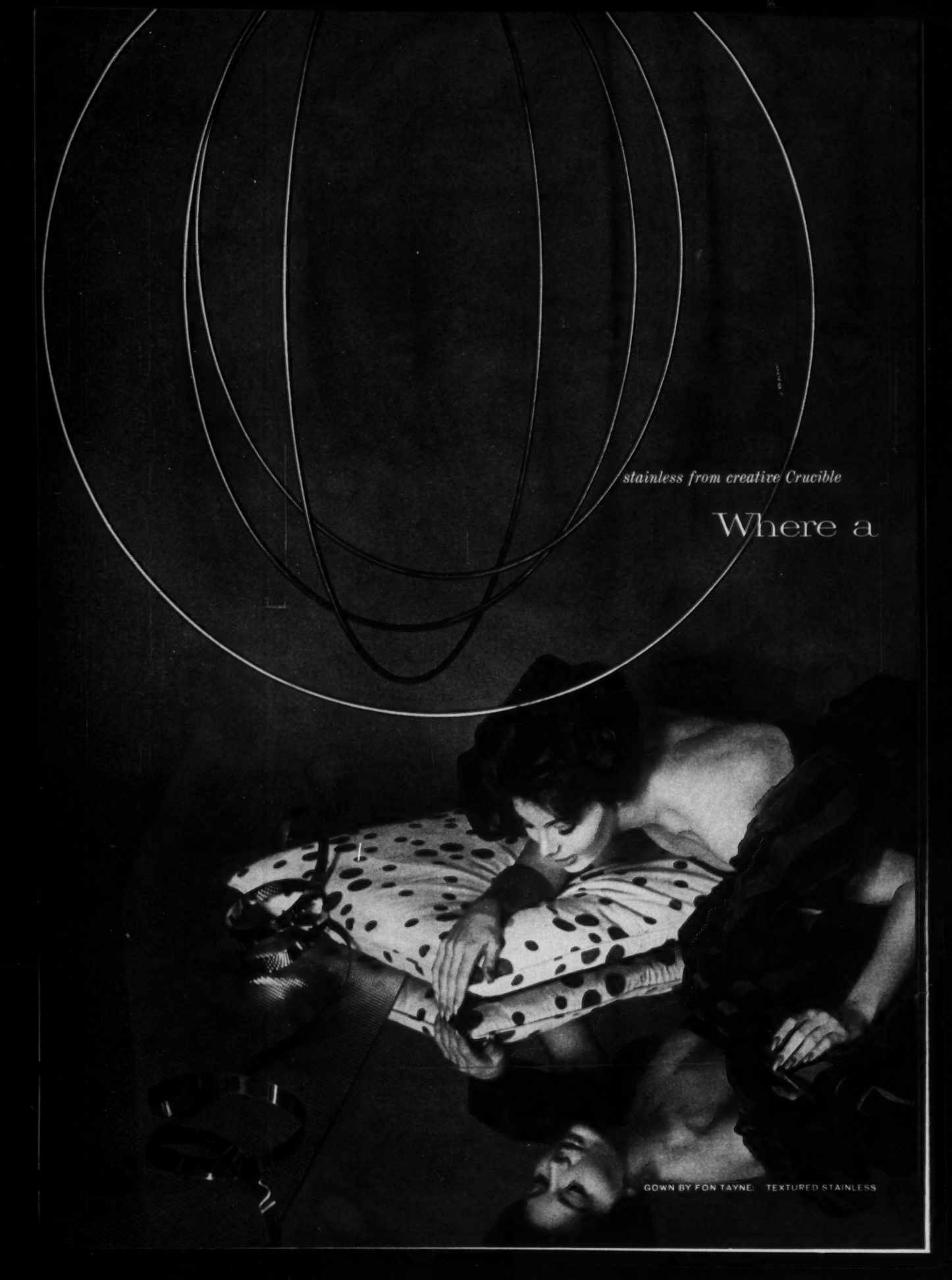
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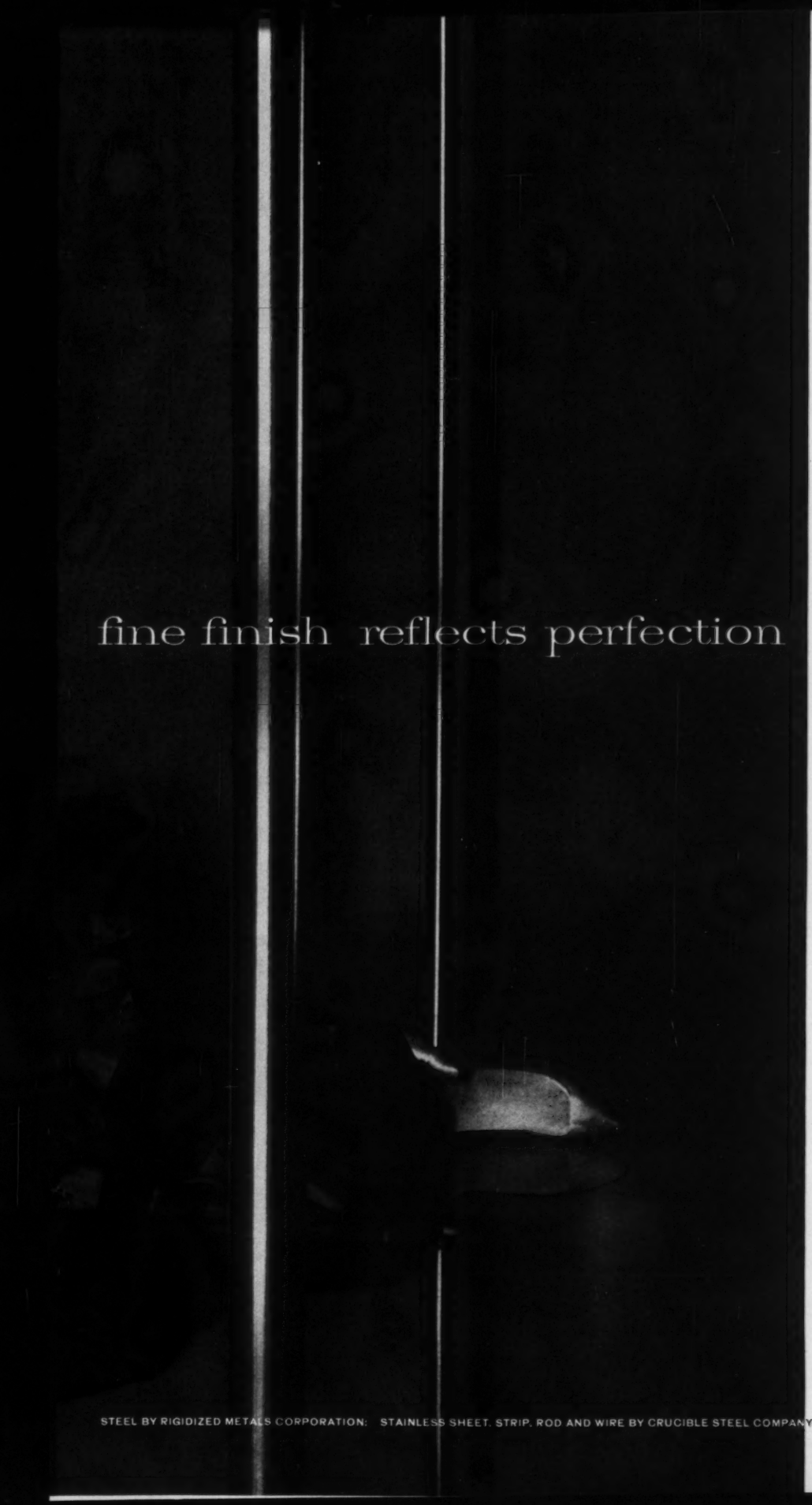

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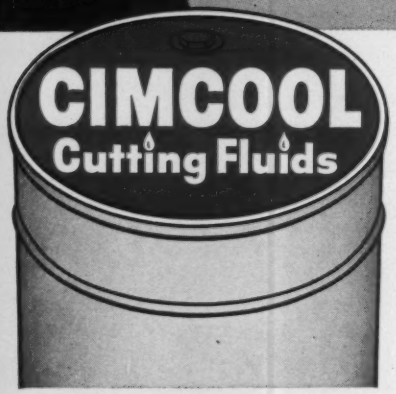

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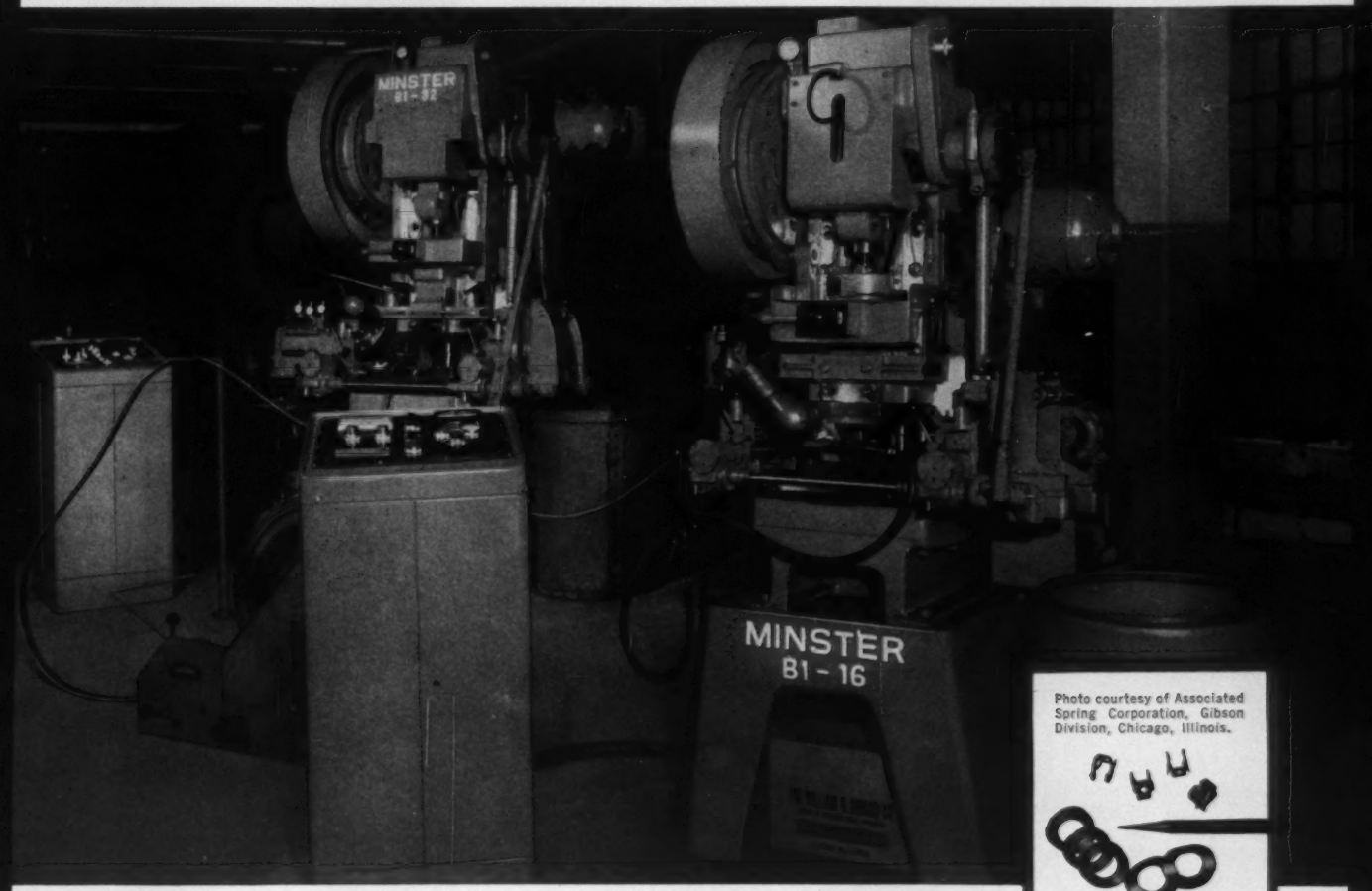

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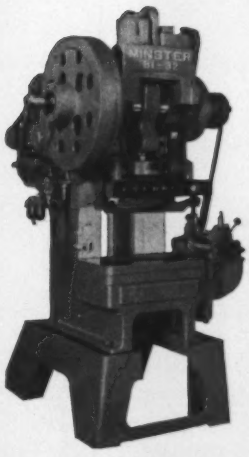

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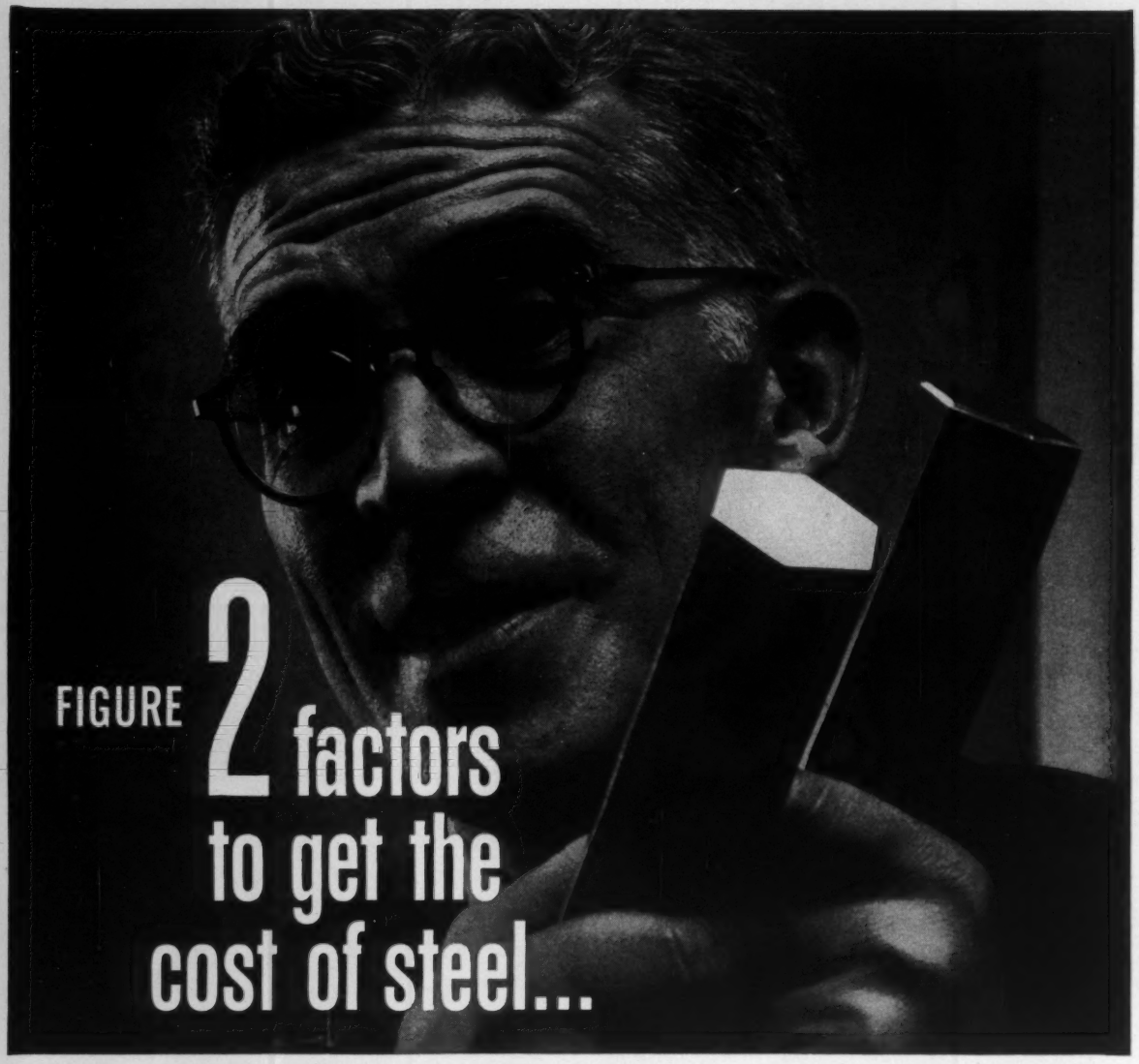

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Cost of capital:	
Inventory	_____
Space	_____
Equipment	_____
Cost of operation:	
Space	_____
Materials handling	_____
Cutting & burning	_____
Scrap & wastage	_____
Other costs:	
Obsolescence	_____
Insurance	_____
Taxes	_____
Accounting	_____
TOTAL	_____

COST OF FREEDOM-FROM-RISK STEEL FROM YOUR STEEL SERVICE CENTER

Per ton, cut-to-size, and delivered

TOTAL _____

500 HEATS!

AT J&L–ANOTHER EXCELLENT ROOF RUN WITH HARBISON-WALKER MAGNEX OHR

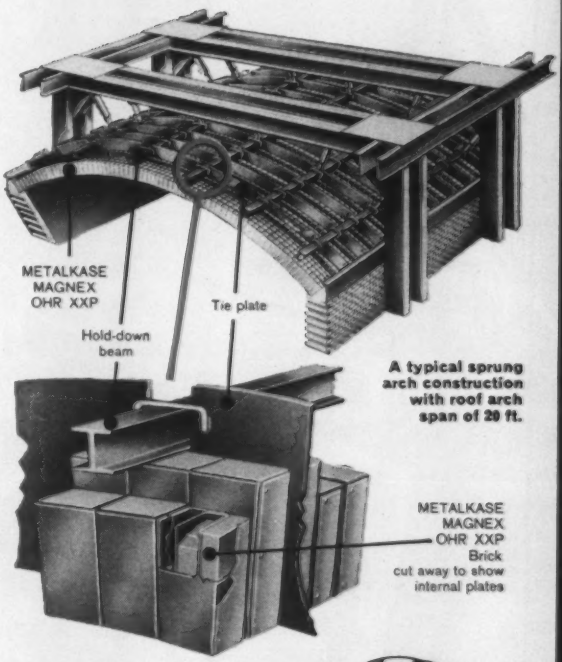
J. & L.'s No. 89 open hearth furnace—with Harbison-Walker METALKASE MAGNEX OHR XXP (former name METALKASE 29-57 XXP) recently completed a run of 500 heats. Unit roof life set a record of 548 heats.

These significant performance records at Jones & Laughlin Steel Corporation's Cleveland Works reflect credit to furnace operation, to construction and to the quality of the brick used in the roof.

METALKASE MAGNEX OHR XXP is an internally plated metal-encased basic brick used for both sprung and suspended open hearth roof constructions of all designs. Excellent service and tonnage records are regularly secured with both types.

The true value of a basic open hearth roof brick is measured by the cost per ton of steel produced. Split roof trials also provide an index to the relative brick qualities. By both standards, the superiority of METALKASE MAGNEX OHR XXP is being demonstrated repeatedly.

Another significant factor in modern open hearth practice arises from the fact that the successful use of basic brick for roofs contributes to greater severity of conditions imposed upon other furnace parts. Here too, the answer is in basic refractories. Harbison-Walker's long-established basic products with their unequalled service records, together with newer specialized brands, fulfill these more severe requirements for bottoms, walls and regenerator checkers, and make the ALL-INCLUSIVE, ALL-BASIC open hearth steel furnace a reality.



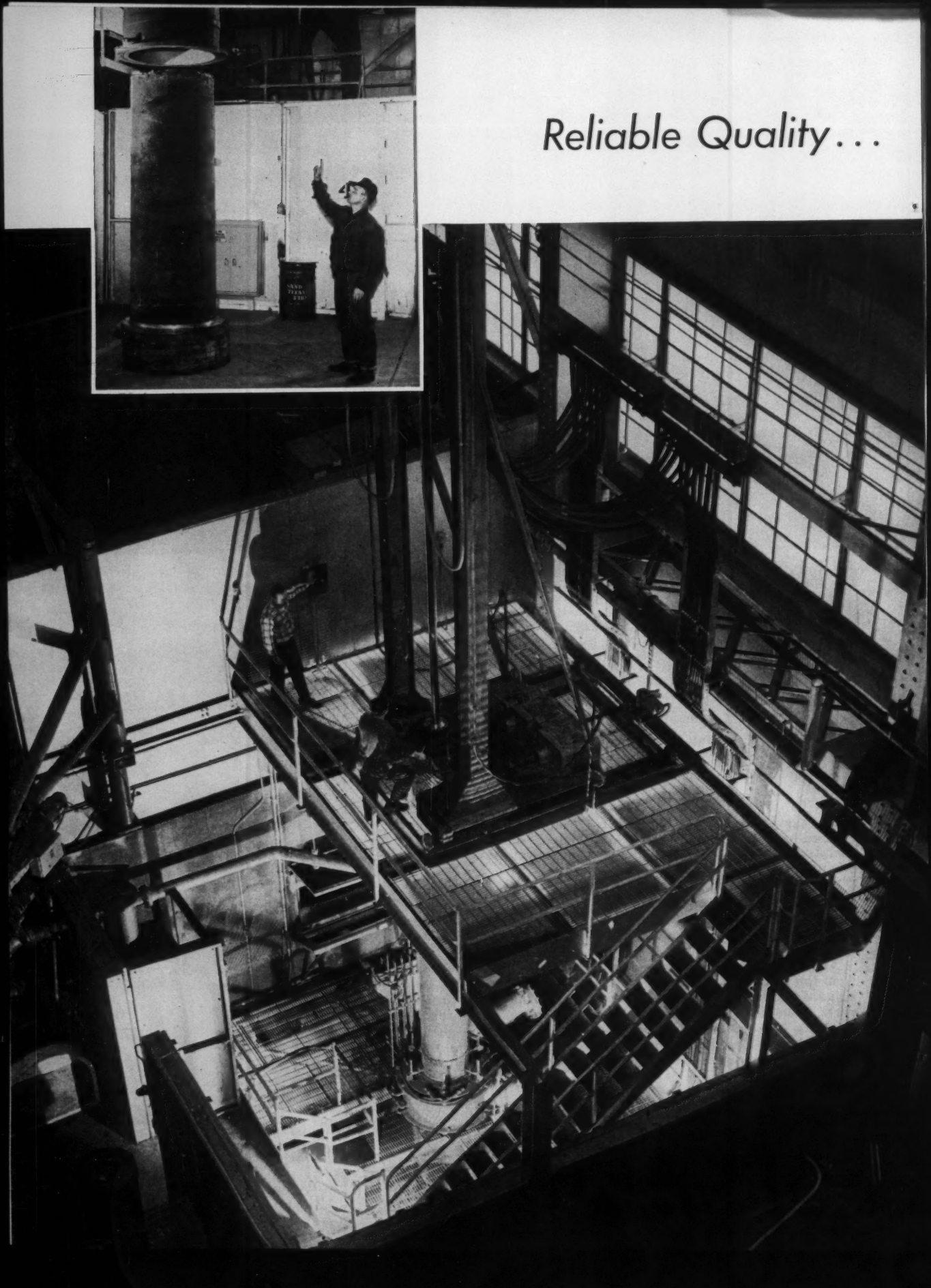
A typical sprung arch construction with roof arch span of 29 ft.

Harbison-Walker Refractories Co.

AND SUBSIDIARIES *World's Most Complete Refractories Service*

GENERAL OFFICES: PITTSBURGH 22, PENNA.

HW 60-10


Reliable Quality...

In Quantity... On Time...

REPUBLIC VACUUM-MELTED METALS

Now produced in up to 20,000-pound heats!

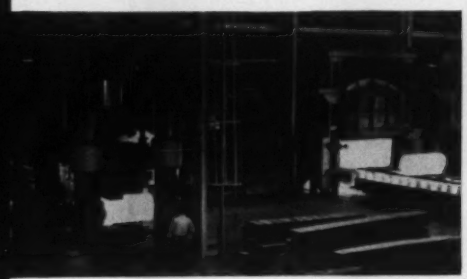
For applications where *reliability* is of major importance, Republic offers *vacuum-melted* metals in ingots, billets, sheets, bar, strip, and wire.

The most extensive facilities ever assembled permit rapid delivery of vacuum-melted metals in quantity and in a wider range of sizes and conditions than ever before possible. Republic is producing vacuum-melted ingots weighing from 4,000 to 20,000 pounds in 18- to 32-inch diameters. Metals available include: super alloy steels, constructional alloy steels, high strength alloy steels, bearing steels, special carbon steels, stainless steels, and titanium.

Republic uses the consumable electrode vacuum-melting process. Metals thus produced offer higher mechanical properties—ductility, tensile strength, and fatigue life. Non-metallic inclusions are reduced in number and size. Testing, certification, job setup, and production costs are reduced.

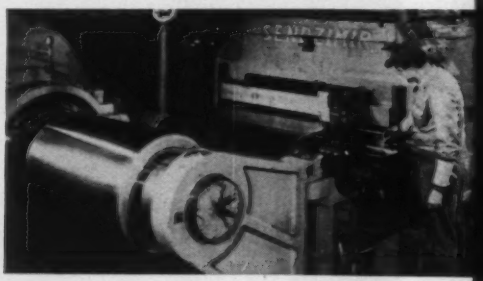
Our metallurgists and engineers are available to help you select, apply, and process the vacuum-melted metal best suited to your requirements. For complete information, contact your nearest Republic sales office today or return the coupon.

Super Alloy Steels • Constructional Alloy Steels • High Strength Alloy Steels • Bearing Steels • Stainless Steels • Titanium • Special Carbon Steels.



BILLETS—Republic's 3000-ton forging press converts vacuum-melted metals to large billets that are ideal for forged parts manufacture. Segregations associated with dendrite freezing are greatly reduced by the consumable electrode process and further alleviated by the greater hot work reduction ratios permitted by large ingots.

BARS—Vacuum-melted metals are converted into close-tolerance squares, rounds, hexes, and many other shapes on Republic bar mills. Virtually any size can be produced—from ¼″ to 10″ rounds and equivalent footweight sections. These bars offer improved ductility, tensile strength, fatigue life, and resistance to scaling.



SHEETS—Vacuum-melted stainless, titanium, and super alloy steels are converted to light gage sheet and strip on Republic's Sendzimir mills. Large coils up to 48″ (36″ maximum on titanium) wide are produced to close tolerances with excellent finishes and strength-to-weight ratios. Sheets up to 72″ wide can be produced on hand mills.

REPUBLIC STEEL

WHERE STEELS ARE MADE

TO MEET THE CHALLENGE OF ACCELERATION

REPUBLIC STEEL CORPORATION
DEPT. IA -9240
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

☐ Please send more information on Republic Vacuum-Melted Metals
☐ Have a metallurgist call

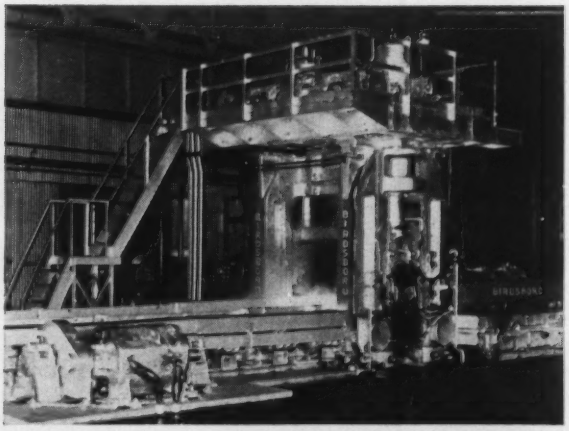
Name_____ Title_____

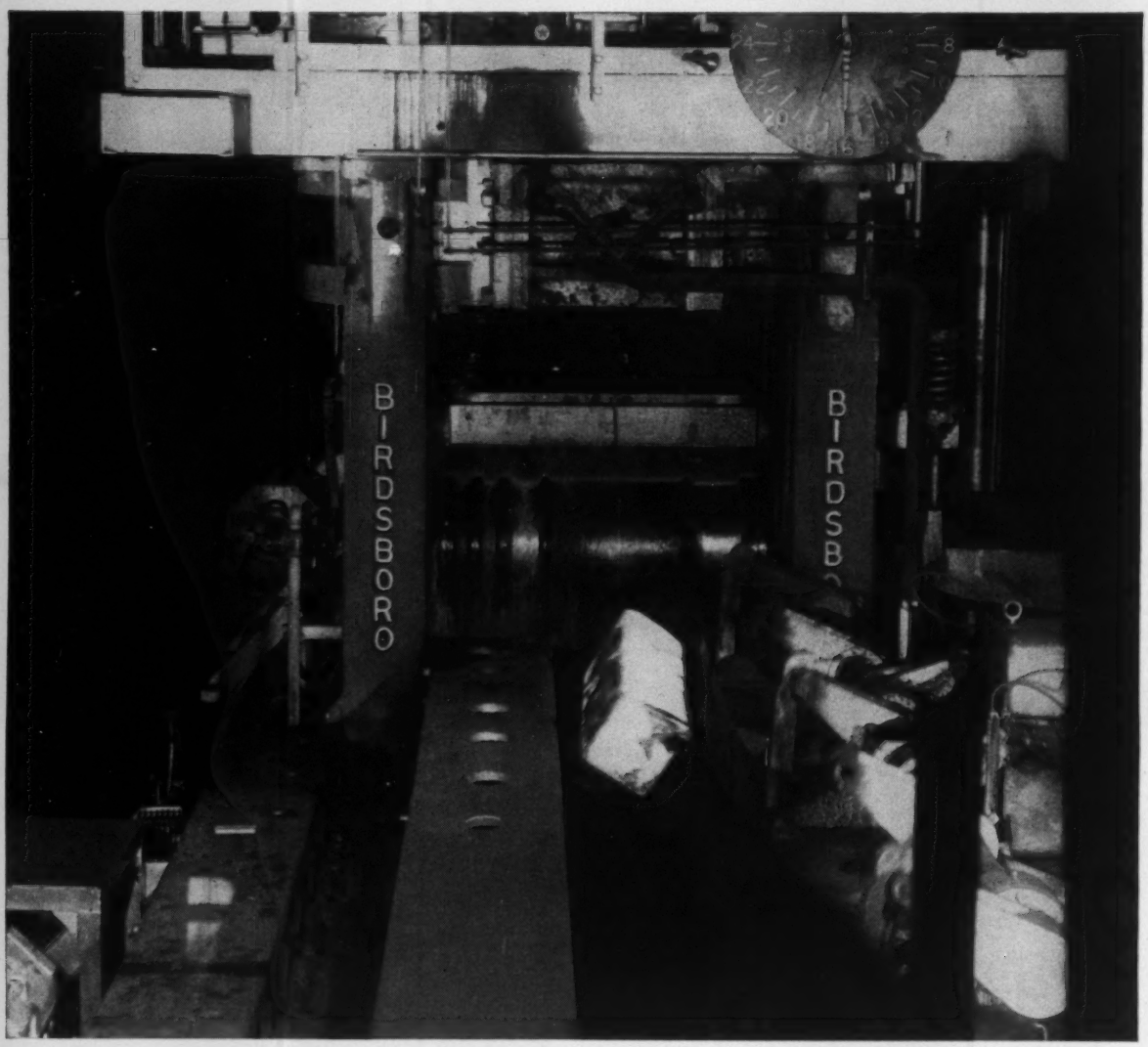
Company_____

Address_____

City_____ Zone____ State_____

Acme Steel Co. picks production partners carefully. Many other noteworthy companies have found that our imaginative, inventive and creative approach to steelmaking fits perfectly into their plans for present and future. As BIRDSBORO has assisted Acme on this installation, we can help you. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.





MM88-60

BIRDSBORO
CORPORATION

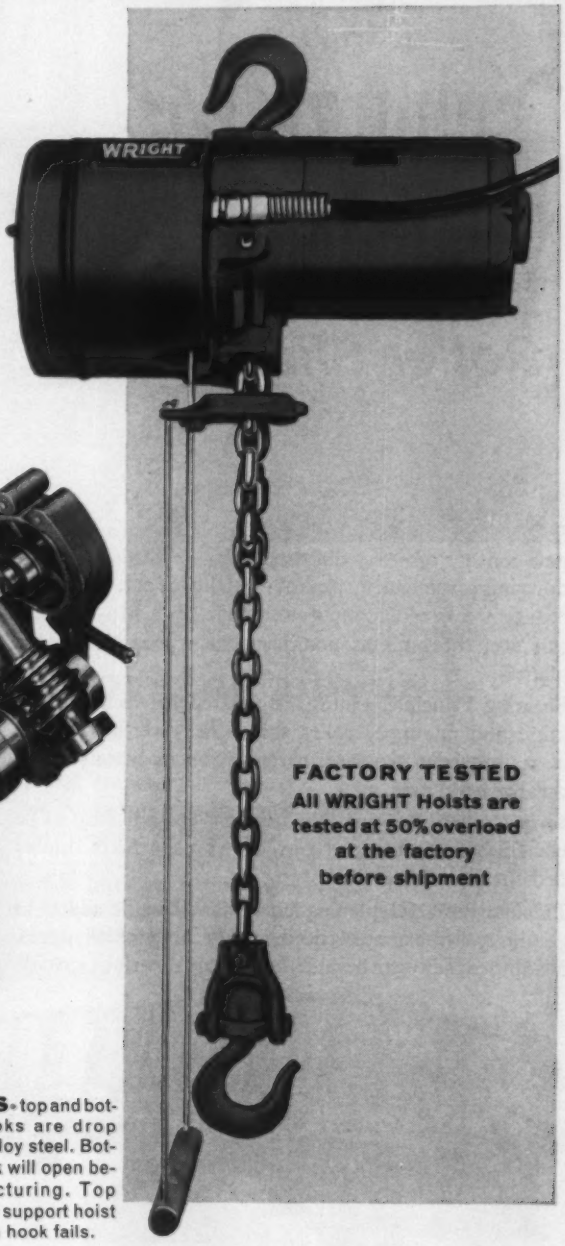
STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel.

Light, Rugged Wright Electric Chain Hoist with Extra Features at No Extra Cost!

• Here's an inside picture of the many extra features you get at no extra cost with the WRIGHT Electric Chain Hoist. Shown is the simply-designed yet ruggedly-constructed "heart" of the famous WRIGHT Electric Chain Hoist. The use of a double worm and gear reduction increases the efficiency of this compact unit, and reduces the weight at the same time. The result is a trouble-free hoist that is light enough to move from job to job and small enough for locations where overhead space is limited.

• Double braking for double safety is another extra feature of the WRIGHT Electric Chain Hoist. Spring-operated motor brake locks instantly when control cord is released. In addition, self-locking worm gear drive also provides positive load braking action. Both brakes work together automatically.

• The WRIGHT Electric Chain Hoist is available with two types of reeving—Single Chain (300 to 2000 lbs.), Double Chain (3000 to 4000 lbs.)



HOIST MOTOR • specially wound to give extra torque for intermittent hoist duty. 15 feet of three wire rubber covered conductor cable with strain reliever attachment.

CONTROLLER • manually operated heavy duty drum type with large contact points and full-arc shields. Fast response enables spotting a load within fractional inch limitations.

HOISTING GEARS • made of high grade phosphor bronze, worms of heat treated steel. Gears are fully enclosed in a continual oil bath.

CHAIN • heat treated alloy steel with zinc coating. Accurately blocked to fit load sheave. Ductile, yet hard enough to resist wear and abrasion.

LOAD WHEEL • drop forged, heat treated alloy steel. Forged integral with load shaft to eliminate the need for connection keys or spline. Chain pockets are precision machined to fit links. Wearing surfaces are hardened, bearing surfaces are ground.

CONNECTOR • drop forged, heat treated alloy steel couplings (connecting the chain and hook) permit hooks to swivel and rock.

HOOKS • top and bottom hooks are drop forged alloy steel. Bottom hook will open before fracturing. Top hook will support hoist if bottom hook fails.

FACTORY TESTED
All WRIGHT Hoists are tested at 50% overload at the factory before shipment

WRITE FOR FULL INFORMATION

Detailed information about the five WRIGHT products shown is available by writing our York, Pa., office. Please specify literature by number

Electric Chain Hoist DH-73
Type "C" Pull-A-Ways DH-56
Safeway Hand Hoists DH-164
Roller-Bearing Trolley DH-242
Jib Cranes • DH-300

WRIGHT HOISTS

ACCO

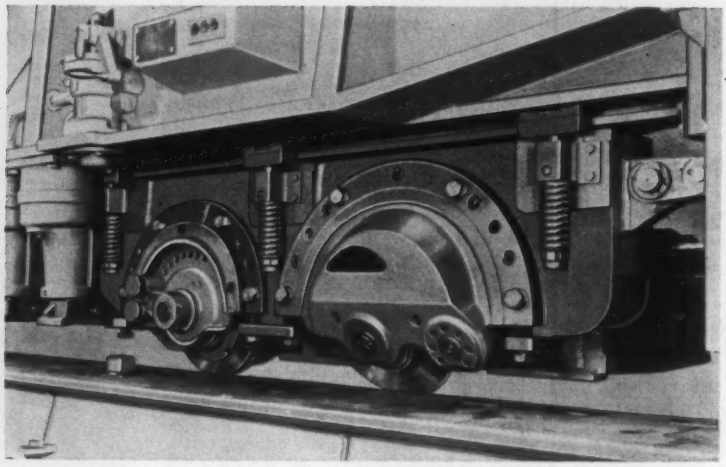
Wright Hoist Division • American Chain & Cable Company, Inc.
York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

A Completely New Method Of Heavy Duty Shearing

by

SCHULZE & NAUMANN

Roller Shears



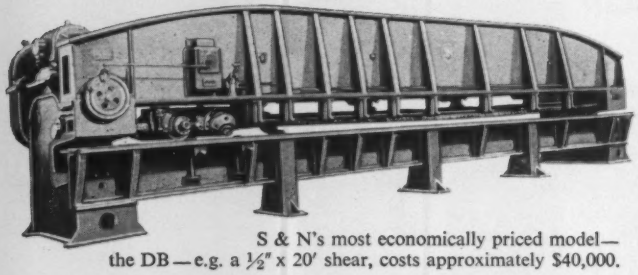
Close-up of carriage with shearing rollers for straight and bevel cut

Schulze and Naumann Roller Shears bring you an entirely new concept of heavy duty shearing—providing tremendous improvements in accuracy, quality of cut, speed and economy over older, flame cutting methods. Most models can even be built as combined shear and plate edge planers.

Shearing Principle. Plates are sheared between a lower knife and an upper roller shear. A powerfully driven carriage carries two shearing heads, one for straight and one for bevel cuts.

Strip Cutting. Positive "hold-downs" permit strip to be cut free of camber, twist or bow on the S&N double bed shears.

Planing. Powerful planing equipment can be added to produce, for example, double vees or profiled edges. Planing capacity can be much larger than shearing capacity.



S & N's most economically priced model—the DB—e.g. a ½" x 20' shear, costs approximately $40,000.

Capacity. Plates from ¼" x 20' to 1½" x 55', or even larger, are sheared in one setting.

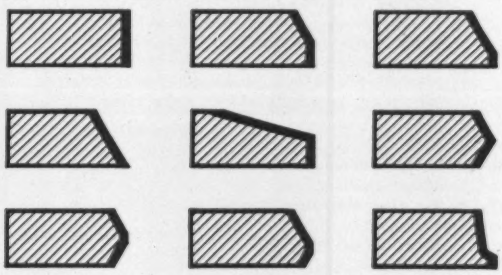
Accuracy. Extremely rigid design and powerful, positive hold-downs guarantee cuts of unequalled accuracy and quality.

Speed. Shearing speeds up to 112 feet per minute are possible. An S&N Shear will cut a greater total length in one day than any other method.

Versatility. Any type of edge preparation is possible, including straight, beveled or combined cuts.

Five different models to suit your needs.

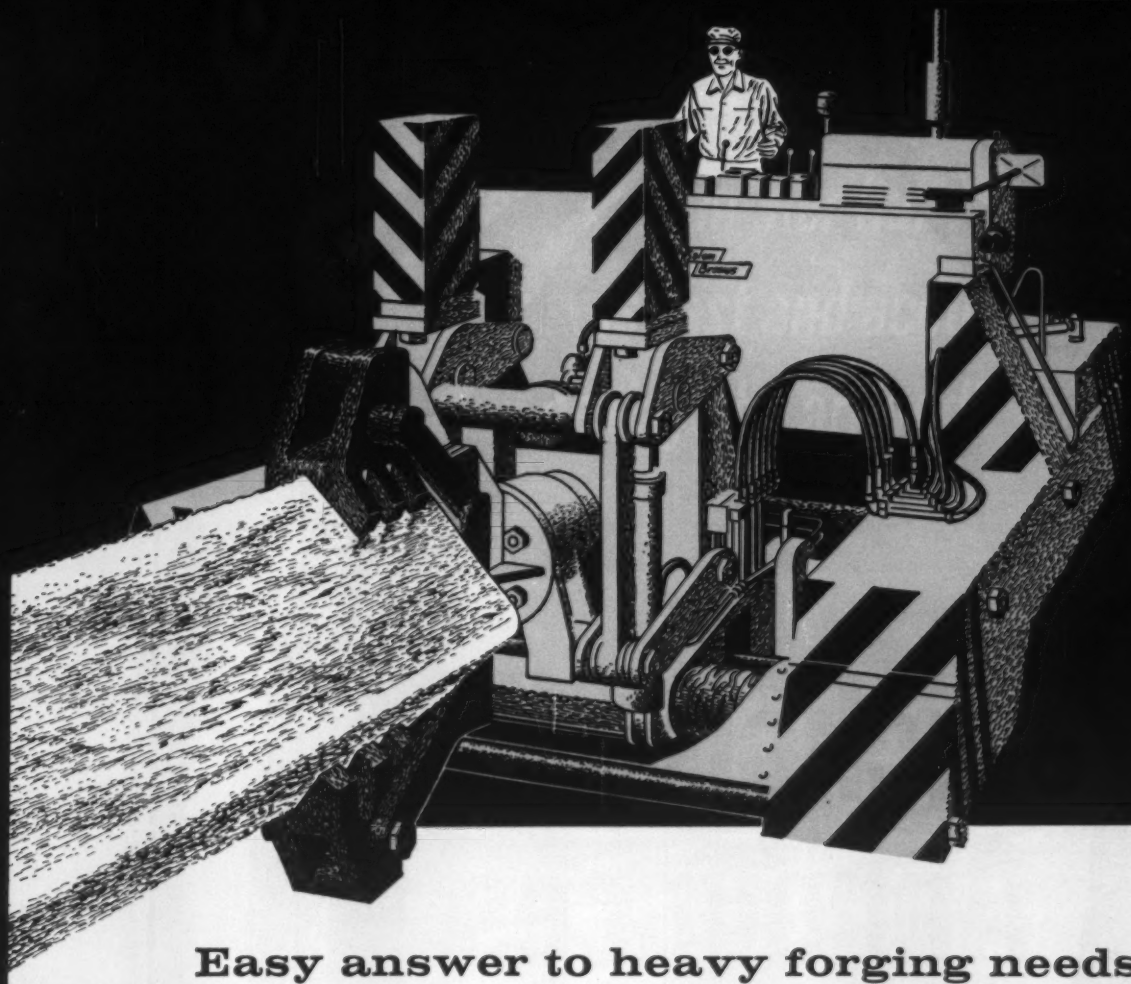
EDGES PRODUCED ON S & N ROLLER SHEARS



Write for more information

COSA

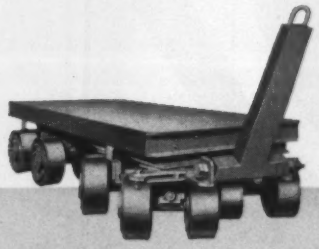
Importers of Leading Precision Machine Tools
Nationwide Sales and Service
COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.



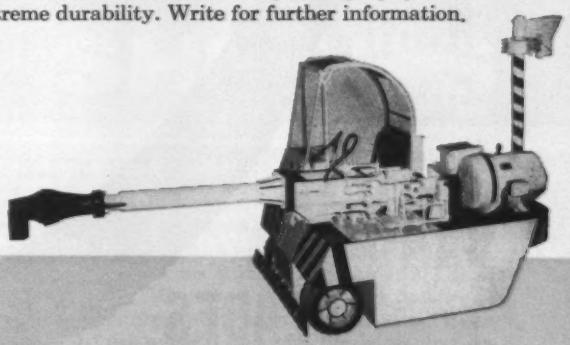
Easy answer to heavy forging needs

The free-moving Salem-Brosius rubber-tired manipulator adds speed, safety and economy to open-die forging. At hammer or press it raises, lowers, tilts, rotates or laterally moves the hot stock, satisfying forge manipulating requirements. Also, it can charge or draw forge shop furnaces, operating with the facility of a fork-lift truck in hot or cold stock handling. The Salem-Brosius Manipulator saves floor space. It travels to furnaces and presses or hammers without freezing floor space with tracks or overhead areas with craneways.

This ruggedly-built machine meets the trend of industry toward hammer and press forging of high alloy, stainless and tool steels, and the many new extremely hard refractory-type alloys. The forging of these metals necessitates manipulating equipment of extreme durability. Write for further information.



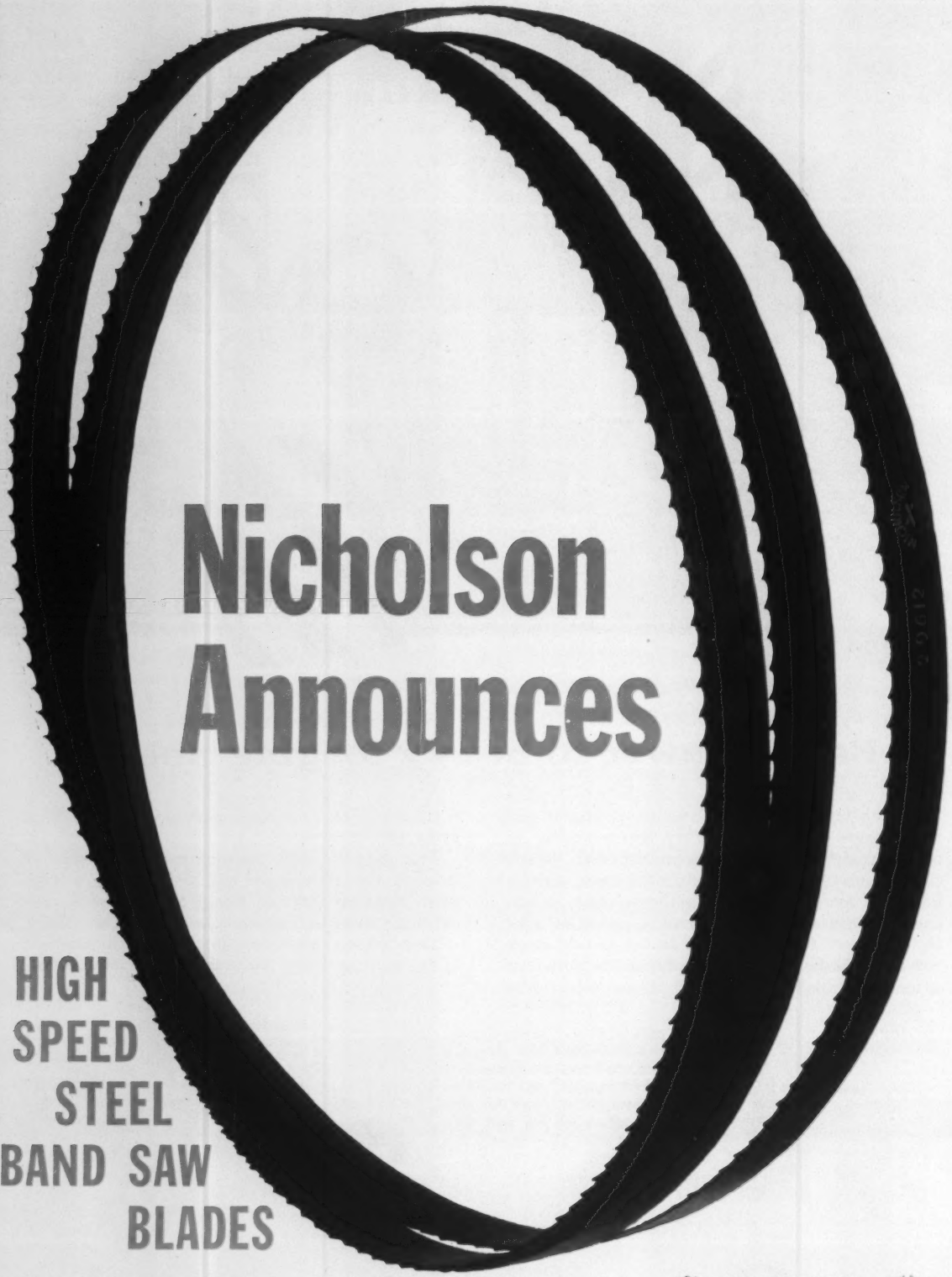
Two other prominent members of the Salem-Brosius family of materials handling equipment are heavy-duty in-plant trailers (left) and the exclusive rubber-tired type furnace chargers shown at the right. Ask about them when you inquire about the manipulator.



SALEM-BROSIUS, INC.

PITTSBURGH, PENNSYLVANIA

Salem Engineering Limited, Toronto, Ontario • Salem Engineering Co., Ltd., London & Milford, England • Salem-Brosius, S.A., Luxembourg • Salem-Brosius, S.A., Paris, France • Alloy Manufacturing Corp., Pittsburgh, Pennsylvania • R. H. Freitag Manufacturing Div., Akron, Ohio • General Ionics Corp., Pittsburgh, Pennsylvania.



Nicholson Announces

HIGH SPEED STEEL BAND SAW BLADES

Now, after extensive research, we have developed a High Speed Steel Band Saw blade worthy of our respected trademark. It's an extra long wearing blade for high speed production. It's now offered by selected Industrial Distributors. Ask your distributor salesman about it. ✻ ***Our products are sold exclusively through Industrial Distributors. They offer the finest goods and services in the least possible time.***

NICHOLSON

Nicholson File Co., Providence 1, R.I.
Files • Rotary Burs • Hacksaw and Band Saw Blades • Ground Flat Stock • Industrial Hammers

"Been workin' her hard for 14 years ...she's as fast and accurate as the day she arrived"

Precision made Niagara Shears are built to cut with micrometer accuracy . . . *and to keep cutting that way.*

Thousands are in use, but comments are nearly identical. Makes no difference how hard they're worked. Three shifts a day, month after month, year after year . . . a Niagara Shear *continues* to be accurate.

"Don't have to change knife clearance"

No adjustments needed for cutting different thicknesses of stock . . . even at the same time . . . with consistently accurate, burr-free results. *And much longer knife life!* The secret is in the rigidity of Niagara's exclusive box section design. "Upped production 25%," says one user, "because we have fewer adjustments to make."

"Costs less to operate"

There's less to do, less to learn and less to go wrong. Never even have to worry about damaging the machine by forgetting to change the knife clearance. Once set, Niagara Shears need no further adjustment. "Been using Niagara's for 10 years . . . never had downtime for repairs or maintenance," says another user. Even after long, hard use when it becomes necessary to turn the blades or change knives, it's a very easy matter. Nothing like Niagara Shears for simplicity.

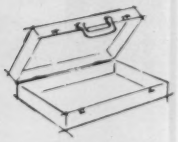
FACT BOOK FOR YOU

Bulletin 69 is filled with customer reports on Niagara Shear performance. You'll value it. Write today.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y. *District Offices and Distributors in Principal Cities*

A. O. SMITH HAS THE HORSES...

HURDLE THORNY APPLICATION PROBLEMS



From the case of the A. O. Smith Motor Man

...a line of 800 to 1 hp favorites, built to make tough application problems seem easy

When it comes to building integral-motor-powered equipment, *make sure of your horsepower source!* Before you specify any motor brand, consult with your A. O. Smith Motor Man. He'll show you how the horses of A. O. Smith (single-phase integrals — 1-5 hp — polyphase — 1-800 hp) help users surmount application barriers.

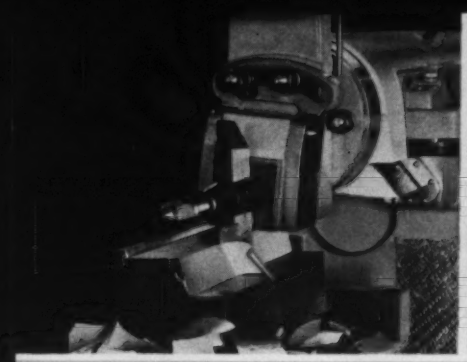
And A. O. Smith delivers the horses that deliver the goods!

COPYRIGHT 1960, A. O. SMITH CORP.

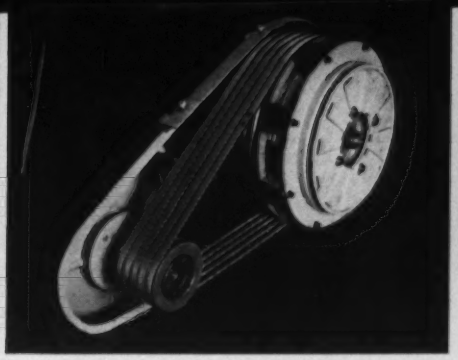
Through research ... a better way

A.O.Smith
CORPORATION
ELECTRIC MOTORS
Tipp City, Ohio

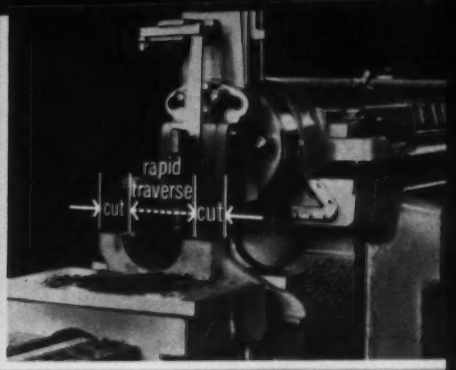
A. O. SMITH INTERNATIONAL S. A.
Milwaukee 1, Wisconsin, U. S. A.



1. This 2" cut, .030" feed, proves the ability of the Cincinnati's 50 psi automatic lubrication to maintain oil films under the heaviest loads.

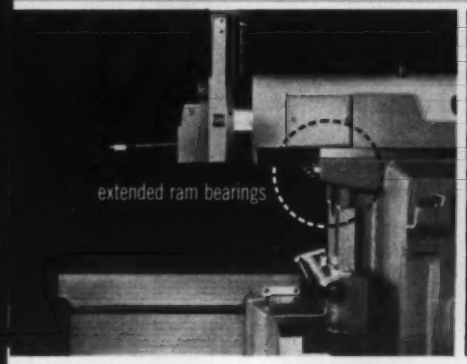


2. Brushless electromagnetic brake and clutch insure fast, easy operation of the ram without grab. They never need adjustment.

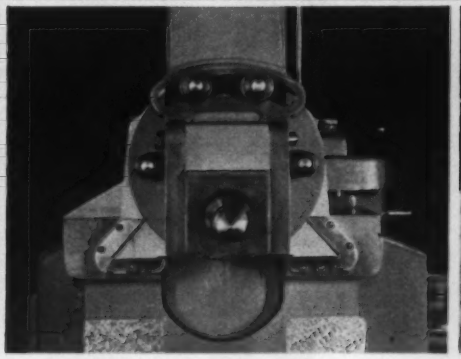


3. Both vertical and horizontal rapid traverse are standard Cincinnati features which profitably reduce time between each cut.

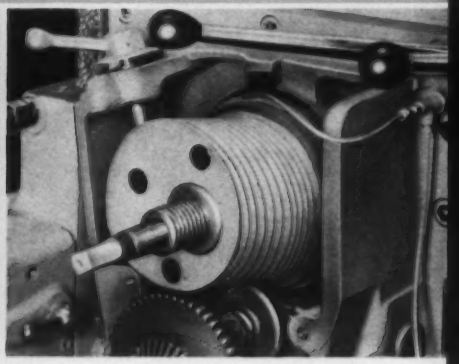
4. Extended ramway bearings increase ram support and minimize wear. Full table clearance to column provides the closest-coupled combination in the field.



5. Solid ramways, free of joints, hold the accuracy of Cincinnati shapers longer than others. Vee ways are cast integrally with the column for extra strength.

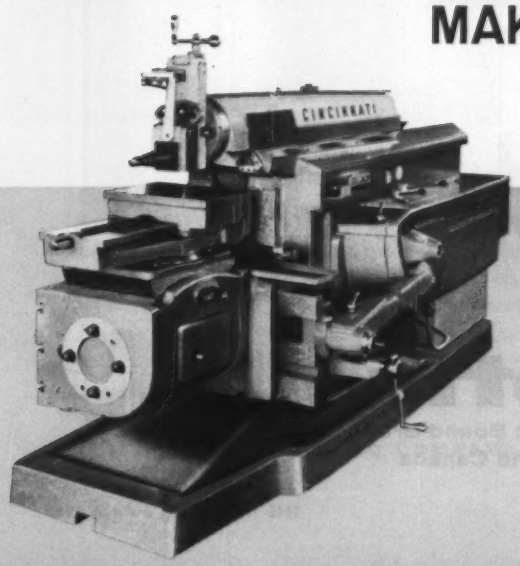


6. Individual cams for each feed, with follower always in contact give you a smooth (instead of a "bump") feed; results in superior finish on every job.



payoff features

MAKE CINCINNATI® SHAPERS YOUR BEST CHOICE



Shapers / Shears / Press Brakes

THE **CINCINNATI SHAPER** CO.

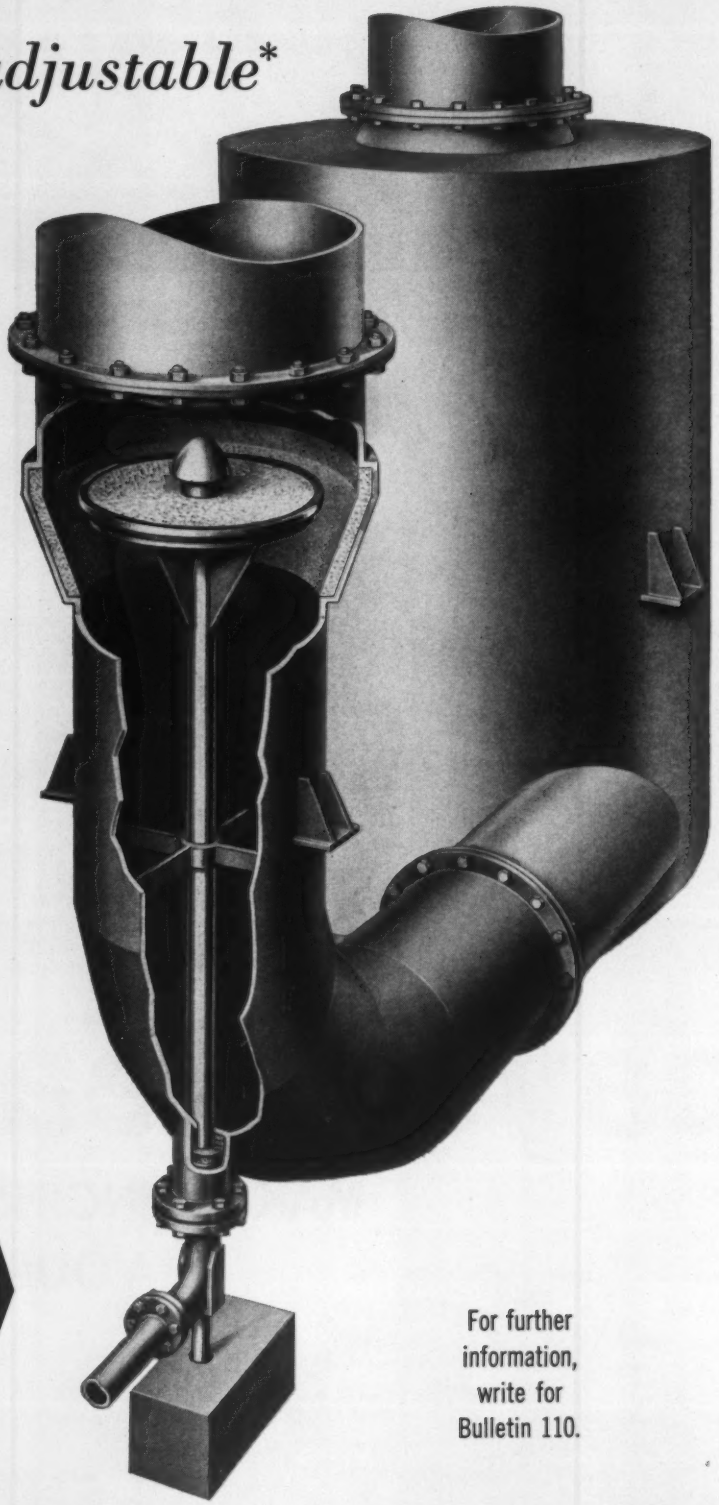
Cincinnati 11, Ohio, U.S.A.

In Scotland: The Cincinnati Shaper Co., Ltd., Glasgow

*Completely adjustable**

Flooded Disc Scrubber

Removes Sub-Micron Fumes



The Research-Cottrell high efficiency scrubber uses the unique flooded disc principle for removing sub-micron fumes in steel-making furnaces and chemical processing.

As shown in the illustration, the outstanding feature of this scrubber is the simple, adjustable "flooded disc." The flooded disc adjusts for maximum cleaning efficiency over a wide range of operating conditions.

* *Automatic positioner immediately adjusts the disc to meet your varying gas and dust control problems.*

Research-Cottrell, with over 48 years of industrial gas cleaning experience, will be glad to consult with you on any specific problem.

For further information, write for Bulletin 110.

Research-Cottrell

RESEARCH-COTTRELL, INC., Main Office and Plant: Bound Brook, N. J.
Representatives in principal cities of U.S. and Canada

RESEARCH COTTRELL INC. TRADE MARK RC207

No. 2 Cold Rolled Shearing Line, Cleveland Works, Jones & Laughlin Steel Corporation

Wean, J & L and Shearing . . .

This precision-engineered line was designed by Wean for shearing cold rolled steel strip at the Cleveland Works of Jones & Laughlin Steel Corporation. This cold rolled shearing line handles 60,000 pound coils in strip widths up to 48″ and gauges from .025″ to .060″, producing leveled, oiled sheet from 30″ to 180″ in length. Speeds up to 800 fpm are possible through the use of improved design lapping conveyors on both prime and reject pilers.

Wean is the world's most experienced builder of steel strip processing lines. Our reserve of engineering know-how is always available to assist you in your expansion planning. To meet your customers' most exacting requirements, why not let Wean's *creative engineering* work for *you.*

THE WEAN ENGINEERING COMPANY, INC. • WARREN • OHIO

This is a throat insert for the nozzle of a solid fuel rocket engine—and it is made possible by a dramatic new isostatic pressing and sintering operation at Sylvania. This operation enables Sylvania to make full use of tungsten, molybdenum and their alloys. It assures rocket and missile manufacturers of a steady and dependable source of supply for the desired refractory metal blanks and ingots.

Forging blanks are no problem for the Sylvania isostatic presses and sintering furnaces; nor are preform blanks for machining or electrodes for arc casting. Sylvania is also equipped to "green machine" the blanks or furnish them to exact finished tolerances.

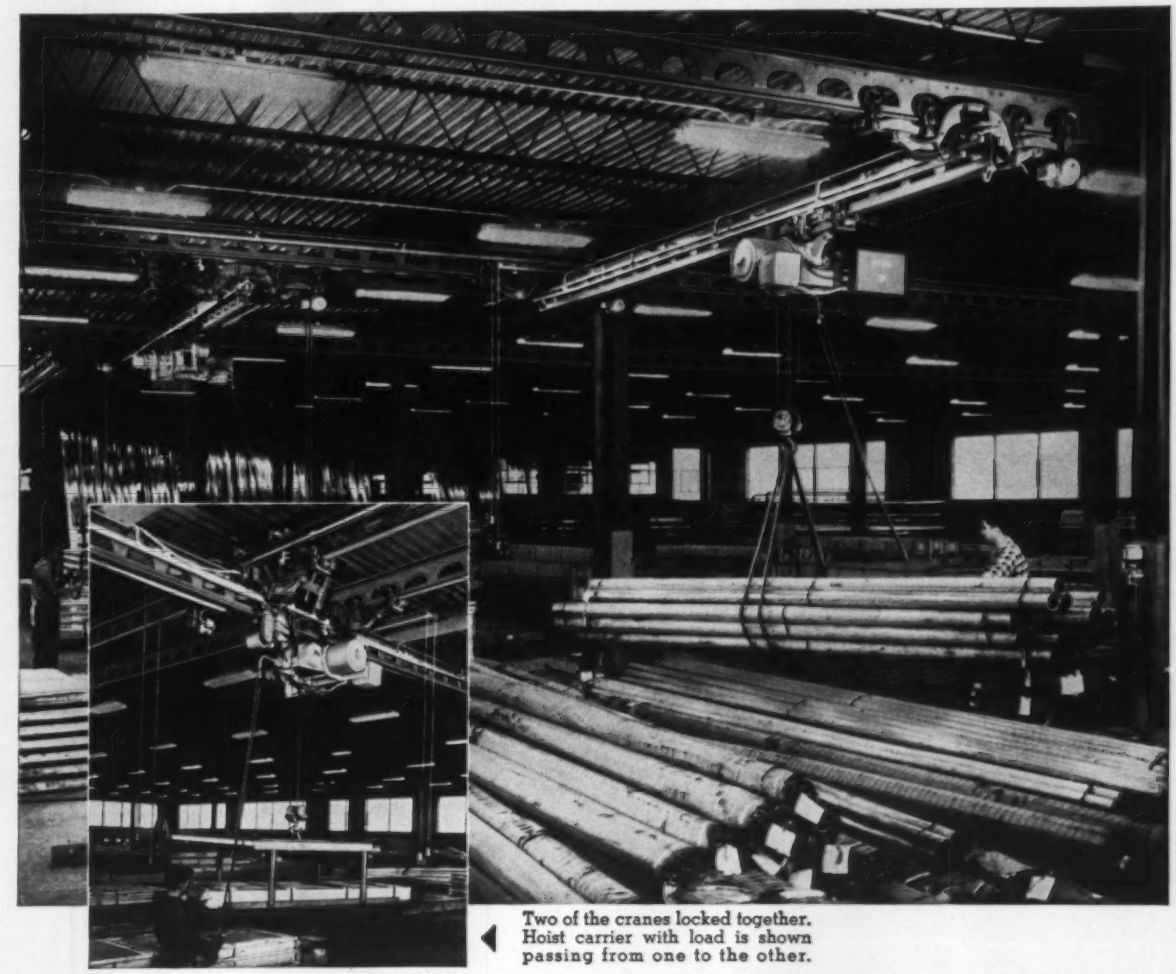
If refractory metals are your materials, and special shapes, sizes or quantities your problem, you'll find the quality and price Sylvania offers to be of distinct advantage. For details, call your Sylvania representative, or write Chemical & Metallurgical Division, Sylvania Electric Products Inc., Towanda, Pennsylvania.

SYLVANIA

Subsidiary of **GENERAL TELEPHONE & ELECTRONICS**

Large bundles of pipe, sheets, etc., are quickly handled from receiving dock to any spot in the warehouse *without rehandling* by the overhead Cleveland Tramrail transfer cranes. Whitehead Metal Products Co., Inc. specialize in a wide variety of nonferrous metals.

TRAMRAIL CRANES
SAVE WAREHOUSE SPACE
Improve Materials Handling Efficiency



Two of the cranes locked together. Hoist carrier with load is shown passing from one to the other.

In the large modern warehouse of Whitehead Metal Products Co., Inc., Cambridge, Mass., the entire job of unloading incoming materials, placing in storage and handling for outgoing shipments is done with Cleveland Tramrail transfer cranes.

The cranes have proven most practical for this service. They can transport long, unwieldy bundles of pipe in much narrower aisleways and turn them ninety degrees for piling without need of wide turnaround areas. As a result, an important amount of floor space is saved, and this provides considerable additional storage capacity.

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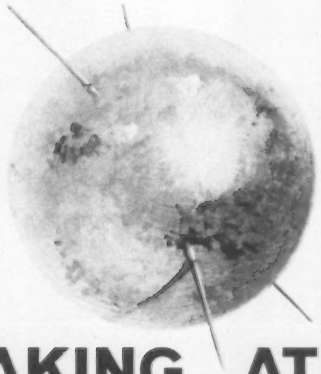

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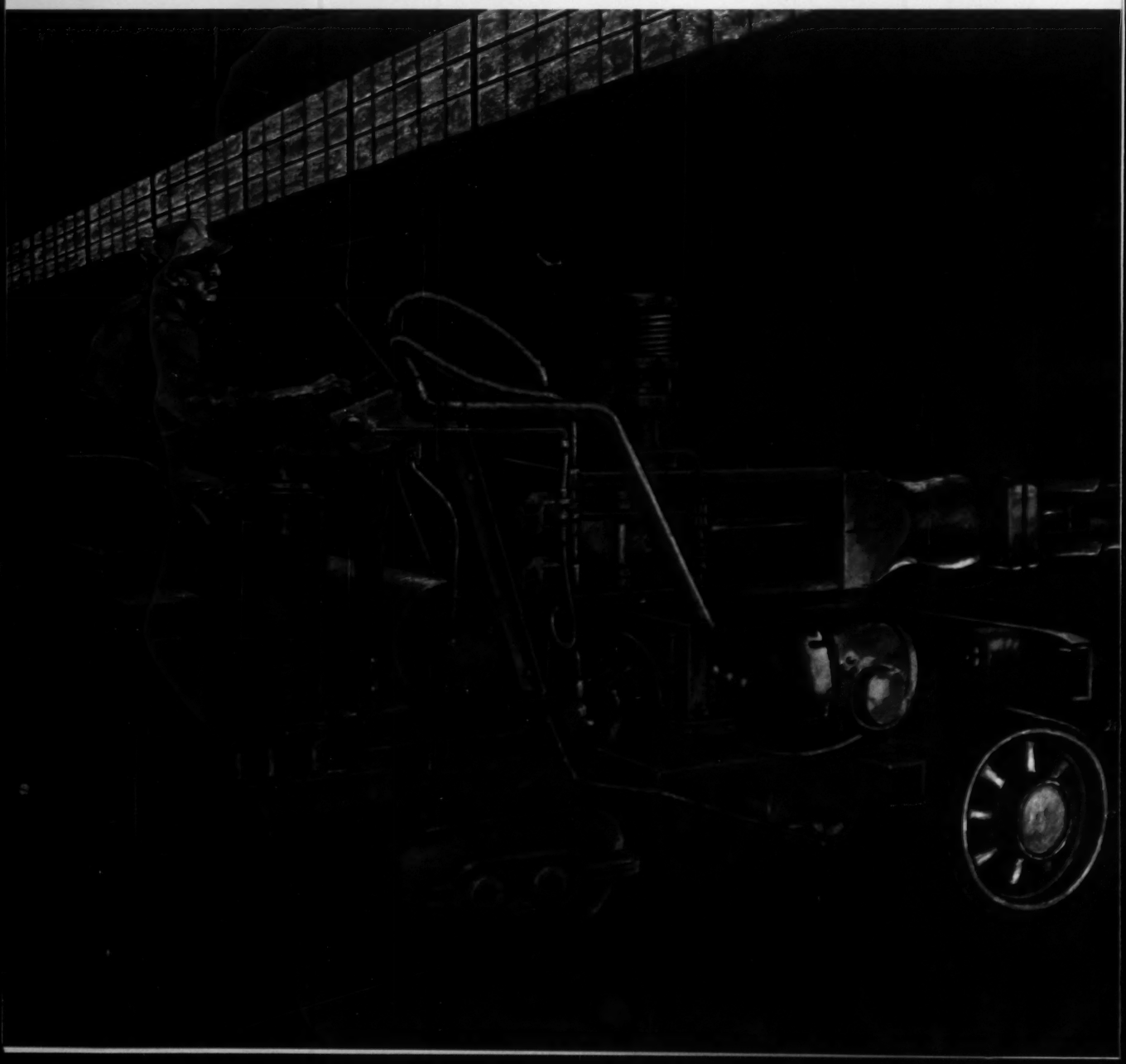

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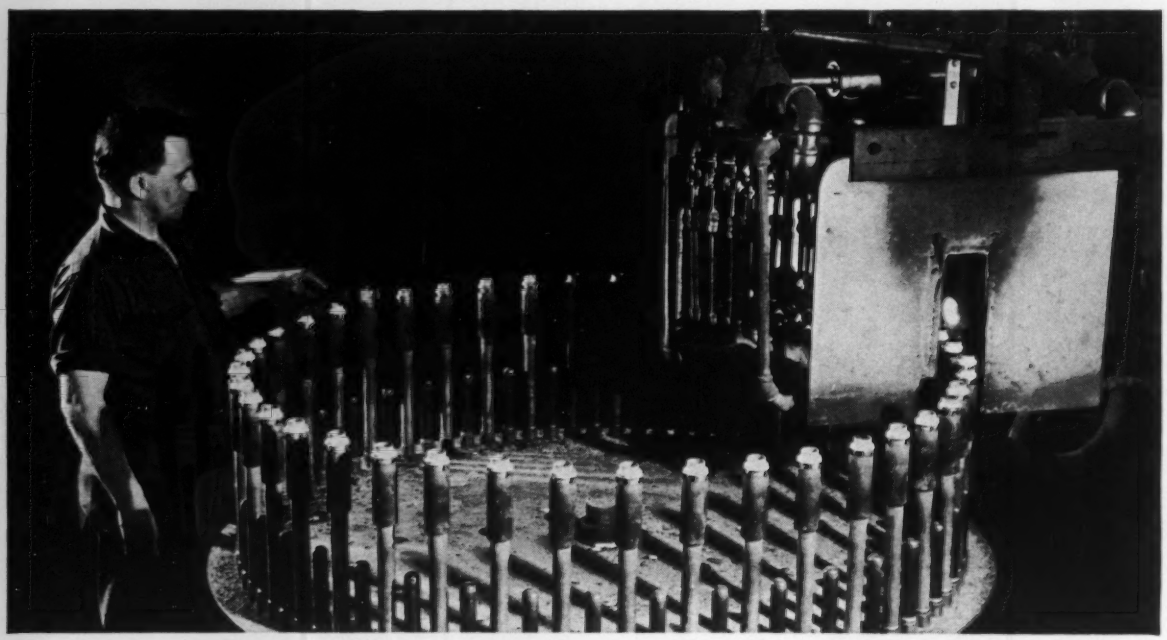
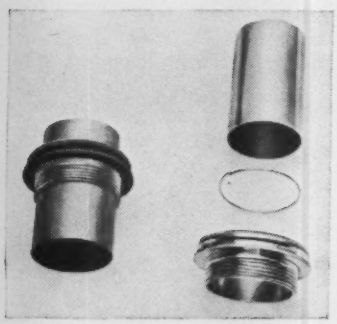


Rotating jig showing mounted assemblies entering and leaving gas-air furnace.



Left– brazed assembly. Right– components with preform ring of EASY-FLO *45.*

This Hartford, Connecticut, company makes—in volume—an assembly that goes into the overflow system of household appliances. The assembly consists of brass tubing and a machined brass casting. The two components are joined by a preplaced ring of Handy & Harman EASY-FLO 45 silver brazing alloy and HANDY FLUX. Heating is automatic gas-air; parts are placed on a rotating turntable to pass through the gas furnace. Every 60 working minutes, 650 assemblies are completed.

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This informative booklet gives a good picture of silver brazing and its benefits... includes details on alloys, heating methods, joint design and production techniques. Write for your copy.

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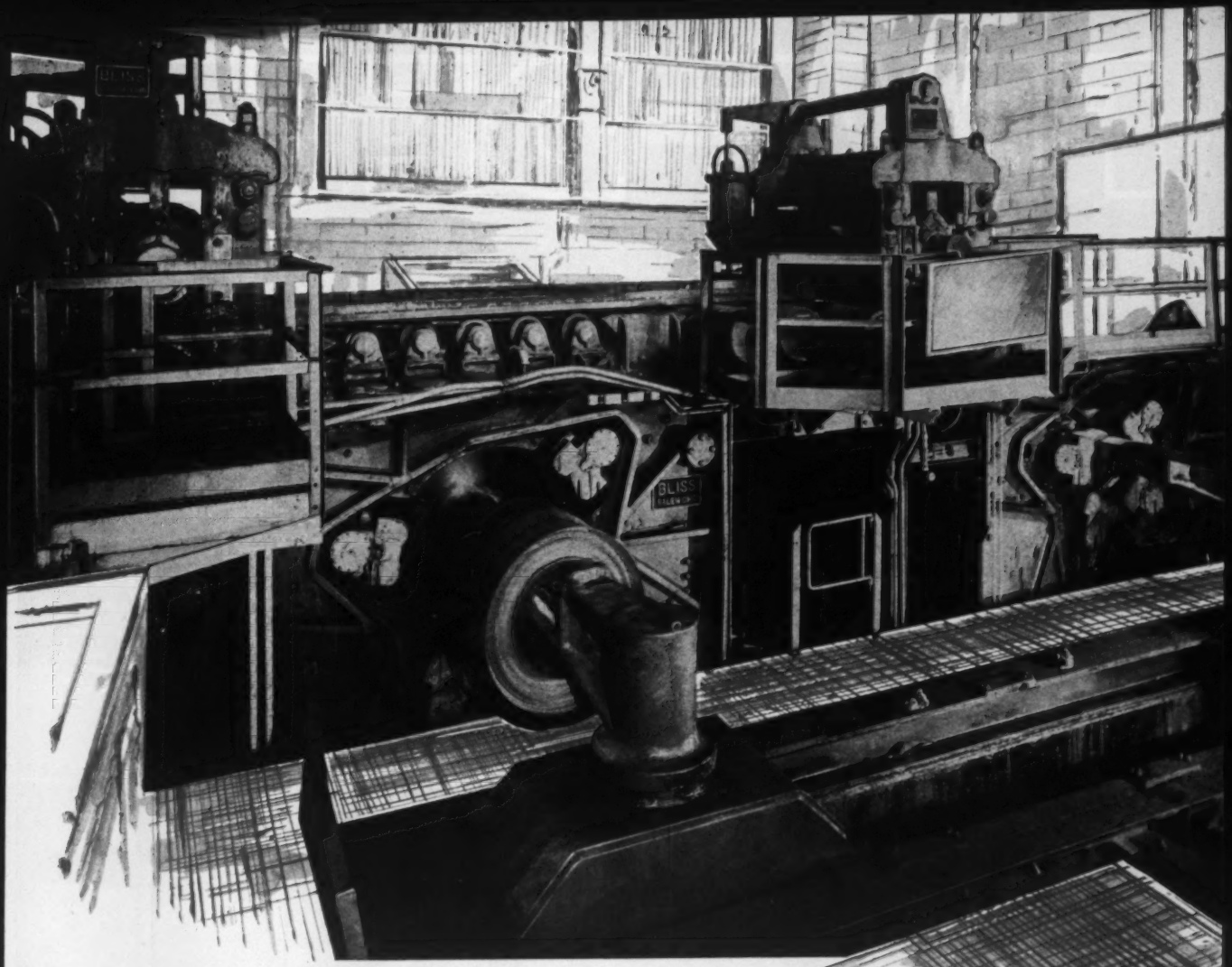

FROM MILD STEEL TO STAINLESS

It's all the same to these two Bliss coilers at Armco

These smooth-running Bliss downcoilers on the new 56" hot strip mill at Armco Steel Corporation's Butler, Pa. Works, coil everything from flexible mild steel to tough, springy stainless steel strip. Bliss coilers, with their expanding mandrels and positive wrapping action were used because of the variety of gages and alloys to be put through the new mill. In the Bliss design, the mandrel keeps the strip in tension during coiling; wraps a tight, smooth-edged coil without surface scratches or marks. Blocker rolls retract as soon as leading end has been snubbed on the mandrel, and don't move in again until the trailing end is coming through the pinch rolls.

Besides the two downcoilers, Bliss' Rolling Mill Division designed and built the 100-yard-long runout table as another contribution to the Butler Works' handsome new hot strip line. For other examples of Bliss engineering for the ferrous and nonferrous industries, why not write for a free copy of the new profusely illustrated 84-page Bliss Rolling Mill Brochure, Bulletin 40-B? It describes the operation of Bliss mills and auxiliary equipment.

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UNION CARBIDE METALS

Only **ELECTROMET** ferroalloys from **UCM** are so deep in extra values to help you.

THE BOOM IS OVER. A gentle leveling off phase for the entire basic economy is indicated. Strength in retail sales, services, and government spending, which constitute about 75 pct of the weight in indexes, will continue. This means the economy will reflect only a mild recession or correction. P. 68

USE CAUTION IF STEEL OPERATING RATE IS A GUIDE-POST in your market analysis. This rate won't be a precise indicator of market conditions in the next few weeks because specialty line mills, to a large extent, will be producing against their own inventory needs rather than to customer orders.

AUTO PRODUCTION FOR MAY WAS HIGHEST TOTAL IN FIVE YEARS as 611,000 rolled off U.S. assembly lines. June production is set at 625,000, also best for the month since 1955. If June schedule is met, output in the first half of 1960 will stand at 3,821,000, up from 3,286,000 in the first half of 1959.

SALES OF DURABLE GOODS INDUSTRIES DROPPED in April to $15.1 billion from $15.2 billion in March, according to Commerce Dept. adjusted data. New orders dropped from $14.6 billion to $14.4 billion for the same period. Changes in new orders were brought down chiefly by decreases in non-automotive transportation equipment group.

RETAIL SALES WENT UP IN APRIL by 3 pct over March after allowance for seasonal factors. Durable goods sales of $6.3 billion, up almost 7 pct over March, paced the increase.

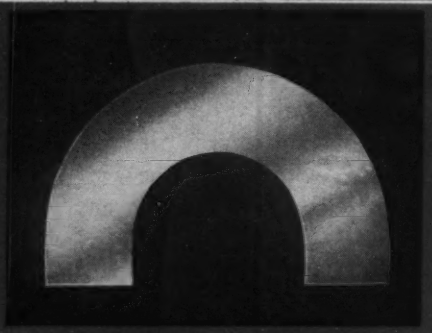
THE LOW POINT IN HOUSING ACTIVITY HAS BEEN PASSED predicts the Value Line Investment Survey. The Survey says the rate of new dwelling unit starts is expected to turn upward in the second half and climb higher in 1961. Reason: The easing in the mortgage money market since turn of the year. A yearly demand of 1.4 million new homes is foreseen for 1963-65.

THE INDEX OF THE AMERICAN GEAR MANUFACTURERS ASSN. shows a 7.5 pct increase for April over March. The April index was 249.2 (1947-49=100) for new bookings. This is above the 1959 average of 234.7. The index of shipments fell in April to 234.8, down from 244.6 in March.

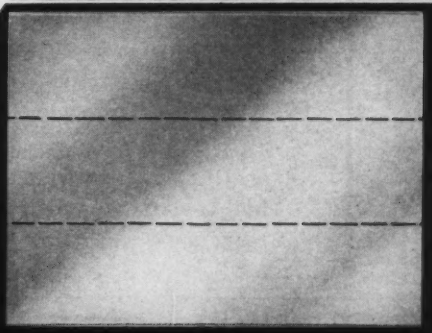
*$100.00 per part production SAVINGS.....

...with the BATH METHOD

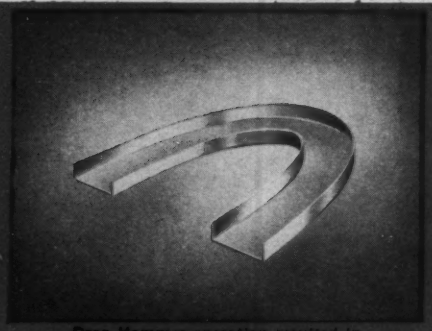
OLD METHOD



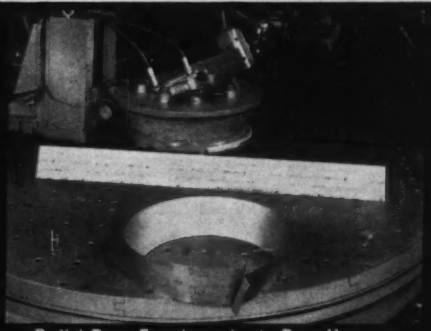
Cutting out the blank in this titanium piece was not only time- but material- waste is evident.



3 titanium parts per piece instead of one.



Drop Hammer operation resulted in heavy scrap loss.



Radial Draw Forming prior to Drop Hammer operation eliminated metal distortion, greatly reduced rejects.

Finished part

Finished part

*The illustrated titanium part was not only expensive to make by old methods, but because of metal distortion, the part reject loss was tremendous. By STRETCH RELIEVING the titanium, using a Bath Radial Draw Former, part rejects were practically eliminated . . . in short, a method of forming shapes that keep their shape . . . even after heat treating . . . *Send for the plant facilities folder, it illustrates both the standard Radial Draw Forming facilities, plus a completely new series of HIGH SPEED production forming machines.*

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Seaway Fights Growing Pains

But Dock Strike Dimmed Prospects for 1960 Season

St. Lawrence Seaway ports have managed to overcome one problem after another.

But the Longshoremen's strike could keep cargo volume below expectations.—By T. M. Rohan.

■ Despite one growing pain after another, the St. Lawrence Seaway is starting to make itself felt as another seacoast for the United States and Canada.

Last year's start-up was admittedly rough. And volume of business was short of forecasts made two years ago. Tonnage was 20.5 million tons, 4.5 million tons short of the prediction. To blame were a long hard winter, shallow channels, new machinery, inexperienced operators and ship crews—and the longest steel strike in U. S. history.

During the winter, most ports beefed up facilities after seeing at first hand last year all the traffic generated by the Seaway.

Strike Zone—But a new blow has struck the Seaway this year—a paralyzing longshoremen's strike. It has tied up general cargo docks in such major ports as Chicago, Milwaukee, Cleveland, Detroit, Toledo and Buffalo, idling about 2000. (Bulk cargo like ore, coal and grain is generally unaffected since other unions handle them.)

The strike came as the Great Lakes ports were preparing for the biggest year in their history. And because of it, much lost tonnage may not be recaptured for years. It shows that Great Lakes ports are susceptible to strike interruption, removing a major selling point against strike-ridden East Coast seaports.

Settlement of the strike came over the past week-end. Work resumed Sunday. Stevedoring companies estimated losses in the 20-day strike at $15 million.

Losing Customers — In Cleveland, port director William Rogers is deeply concerned at the set-back.

"Industries and companies that had never before used the waterway assured us they would try it on an experimental basis this year," he says. "Scores of other companies had planned to step up their shipments because of the savings they made through the Seaway in 1959."

The strike started May 16 and was well publicized in advance. Operators diverted many ships before they entered the Seaway. Others unloaded wherever they could and left.

Mr. Rogers said the strike cost Cleveland about 45,000 tons of cargo.

Teamsters Buck ILU — Detroit has looked like a staging area for an invasion. The Teamsters Union has kept a dock open there. Teamsters are also unloading at Ashtabula, O. Toledo settled early with the International Longshoremen's Union and has drawn extra tonnage through the port.

But seaway schedules will be disrupted all year. And cargo tonnage estimates have been knocked into a cocked hat.

"The dock strike not only cut actual shipments but caused a slowdown in shipping bookings before it broke," says Max Cohen, Chicago Port Authority. "Shippers cut back in anticipation of the strike

TWO-WAY TRADE: Jeeps, bound for world markets, are loaded at Toledo. Nonferrous billets and ingots (right) came from Europe.

to the extent that we'll be lucky to break even with last year."

Outlook Still Good—Despite the initial strike-slowdown, a check of major ports discloses the long-term potential is still extremely strong. About 38 lines are now coming into the Great Lakes. And this season they include Japanese, Greek and Yugoslavian lines.

The largest single tonnage item through the Seaway last year was iron ore, despite the steel strike. Prospects for this year are less bright because of the end of steel-strike hedging and lowered demand for steel.

Ore tonnage last year was 6,187,000 tons, all of it coming into the Great Lakes area, none outbound. This was 30 pct of total Seaway movement. And it was far ahead of second-place wheat at 3.3 million tons, mostly outgoing.

Low Steel Imports—Of the 6.1 million tons of ore, 85 pct came from the big Labrador deposit. The rest, mostly specialties, came from Venezuela, Chile and Africa.

The shipment of steel products through the Seaway hasn't been too big an item. Of 4.3 million tons of imported steel that came into the U. S. last year, only about 5 pct or 148,000 tons came down the Seaway. However, of total U. S. steel exports of 1.5 million tons, only 34,291 tons went out the Seaway. This year a new trend was started with an all-water shipment from Cleveland of 6000 tons of wide sheet to a British automaker.

Port of Chicago — The biggest Lakes port, Chicago, had expected to ship out over four times as much bulk cargo as last year and 40 pct more general cargo. In 1959 the port handled 345,226 tons of general cargo export and 359,368 tons of general cargo import. Bulk shipments were 452,335 tons outbound and 29,925 tons inbound. Before the dock strike, estimates were 489,000 tons of general cargo out and 1.9 million tons entering.

Total Chicago facilities are second only to New York and include Navy Pier, Gary and Indiana Harbor, Ind. The city plans another $25 million bond issue for additional cranes, warehouses, dock space and other facilities.

Showing the influence of the Seaway there, port calls by overseas vessels went up 43 pct last year, reaching 522. Japanese lines have indicated they may call this year, bringing cargo all the way from Japan.

Dairyland Docks—Nearby Milwaukee tripled its overseas cargo imports last year from 67,000 in 1958 to 200,000. Ten new shipping lines established offices there and it was the leading outgoing port for Grace Lines and American Export. However, Grace Lines pulled out of Seaway service this year, waiting until volume picks up.

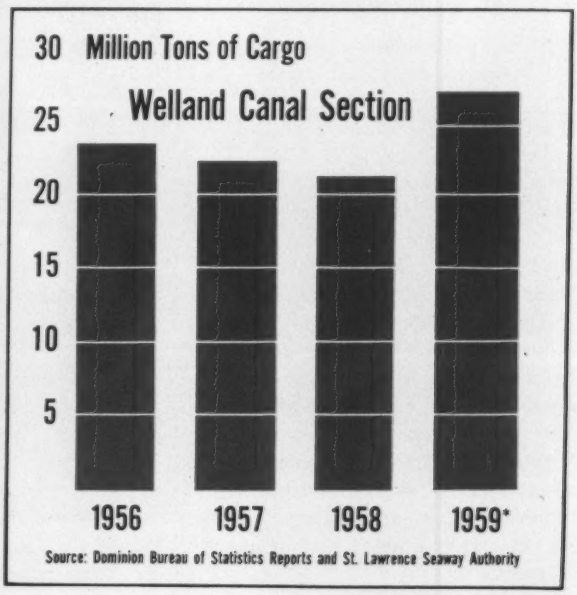
An unusual aspect of trans-shipping occurred when steel from Italy was unloaded there and put on trains for Manitoba, Can.

Kenosha, Wis., is the third largest port on Lake Michigan. Last year it handled 117,762 tons of cargo including 2285 incoming foreign cars.

Detroit's Busy Docks — Detroit was the second ranking Great Lakes port last year and has been the hottest one this year in the Longshoremen's strike. At one of the two struck docks in Detroit, Teamsters longshoremen crossed picket lines and unloaded cargo destined for Chicago and Milwaukee saying they have a contract to uphold.

Meanwhile, many more cars are

Seaway Cargo Traffic Shows an Increase



expected to go out of the motor capital through the Seaway, some as far as Japan. Thousands of imports come in too, which must be galling for the automakers to see.

Chrysler Corp. expects to double volume of car and truck shipments from Port of Detroit this season because of "expanding overseas marketing operations."

Exporting Autos—L. W. Brass, general traffic manager of the Overseas Div. estimates $20 million worth of Chrysler-built cars and trucks will be exported from the docks of the Detroit river in 1960, making Chrysler the leading auto exporter from the Great Lakes through the Seaway. The steady increase will be in proportion to ships calling from various market areas.

Overall Detroit shipments were expected to be up 26 pct from last year in a pre-strike survey by the Detroit-Wayne county port commission. Last season 610 overseas ships called, compared to 501 in 1958. Total tonnage was 264,000 a whopping increase from 1958's 86,661.

Buckeye Business — The Ohio ports of Cleveland, Toledo and Conneaut are taking in more tonnage and in the last year have beefed up facilities. Cleveland's cargo facilities now are considered adequate for several years ahead. The largest single handler, Cleveland Stevedore Co., last year put through a $450,000 expansion amounting to a five-fold increase.

"The shipments into Cleveland last year were a complete surprise —about 10 times what we figured," says Thomas Coakley, president.

"We're now completing a $450,-000 expansion which increases our capacity five times over a year ago. We can berth eight average size ships instead of five and have added a fourth 50-ton diesel railroad crane. We can now lift 80 tons and move it directly from ships onto trucks or freight cars. Many new shippers are going all-water from Cleveland and new plants are looking into it," he says.

THE LINE FORMS: Foreign ships, at anchor in the Detroit River, await their turn to unload and load cargo at Detroit's largest dock—one of the few unaffected by the Longshoremen's strike at Great Lakes ports.

Cleveland Tonnage — Cleveland racked up increases last year of 285 pct on imports, and 70 pct on exports and still has adequate capacity for the next several years. General cargo imports jumped from 27,621 tons in 1958 to 108,509 in 1959 and bulk cargo showed about the same proportinate increase. Exports also went up by 70 pct. Foreign vessel calls were up from 475 in 1958 to 574 last year.

Buffalo has shouldered its way into the Seaway picture with a bang. An idled lakefront auto plant has been converted into the largest handling facility on the Great Lakes.

Buffalo's Facilities — International Terminals Inc. of New York took over a Ford assembly plant idle about 3 years and is now sprucing it up. The dock has 25 ft of water and tracks for a gantry crane. Five ships can be docked simultaneously. Indoor crane facilities are more than adequate. A huge parking lot is also usable for bulk storage.

Another terminal at the end of the old New York state barge canal, Templeton Terminal, is operated by Pittston Stevedoring Co.

Buffalo import-export tonnage last year skyrocketed to 108,262 tons from only 13,684 tons in 1958. Foreign vessel calls totaled 139, compared to 79 the previous year. This year the port started exporting scrap to Europe.

Toledo Plans Growth — Toledo has for years been a top bulk port for coal, thanks in part to the space afforded by the broad Maumee river. Several years ago it set up the only Port Authority in Ohio. The Authority has since set up a $500,000 cargo handling facility plus other leased storage.

Toledo became a big Seaway port in a hurry last year when a shipment of 874 Volkswagens was diverted there from Balitmore last October by a waterfront strike there. Now the cars are arriving regularly in lots of over 800. Officials say there is a saving of about $40 per car this way.

Total general cargo tonnage in Toledo last year was 69,327 tons, mostly through the upriver Toledo Marine Terminals. Hopes for this year, before the strike started, were for about 125,000 tons and for 350,000 tons annually within 5 years.

Coming: More Vending Machines

Sales of vending machines keep increasing as more varied, more costly products are handled.

The surge makes the industry a strong capital equipment market.—By K. W. Bennett.

▪ Vending machines, from the penny scale at the corner drugstore to a plush version that delivers a hot turkey dinner, are big business.

The industry reports 1960 will be even bigger than the $2 billion-plus in goods marketed through machines last year. A spokesman for Automatic Canteen Co., comments simply, "Business is booming." Board Chairman J. L. Wilson, Universal Match Corp., big U. S. producer of coin handling devices, told The IRON AGE, "We're running well ahead of last year, though I can't give you a figure."

Rapid Growth—This means the 175 makers of vending machines and vending machine parts will produce more units this year than last. The number of machines in service has been rising at a 250,000 unit per year clip since 1956, hit 300,000 new units in service at the end of 1959.

R. W. Wagstaff, vice chairman and chief executive, Vendo Co., major producer of vending machines says, "We expect sales well in excess of $50 million at Vendo this year, up from $45 million in 1959. The industry as a whole should expand by at least 10 pct this year, and equipment suppliers should do even better.

"Vendo should exceed this figure due to the replacement market, the growth of the international market, and the introduction of new products." Vendo split its stock two-for-one last week, then boosted the dividend.

Food Use Leads—Vending machine sales rose 17 pct in 1959. The long range outlook suggests that by 1965, $4 billion worth of goods will sell annually through vending machines. It's estimated there are currently 4 million vending machines pouring out whiffs of oxygen for hangover sufferers, handkerchiefs, hot dinners and cracked ice to mention a few items.

The surge in vending machines makes the industry a strong capital equipment market. For example: Food is a No. 1 growth market. One industrial plant in five, according to a recent survey, already offers lunches to employees via vending machines. A conservative forecast suggests by 1969 at least 100,000 machines will be needed for hot foods alone.

Rising Goals—A series of rapid consolidations has already begun in the vending equipment industry, as machine builders prepare to expand output. There are several good reasons for the strong forecast in increased output of vending machines.

Where Vending Machine Volume Lies

	1959	1958
	Millions of Dollars	
Total Value of Shipments	128	109
For Beverages	76.3	62.1
For Foods	19.2	14.9
All Others	32.6	32.4

The Leaders (In Dispenser Units)	Units	
Soft Drink (bottle)	133,054	110,569
Cigaret	95,859	98,989
Bulk Food, Candy	80,324	77,423
Candy Bars	30,639	26,271
Coffee	17,079	13,093
Multiple Food Units	15,842	9793

First and most important is new products. Vending machines will begin making change for paper currency this year in a big way. They'll be able to handle at least $10 in paper money, may go to $20 before the end of the year. Vending machines will then sell higher cost items, including haberdashery.

Another major advance is packaged hot foods, rather than the canned hot food offered in the past. Both canned and packaged foods will be available, and both are in a boom. Foods sales through machines advanced 29 pct in 1959.

Changing Markets—Another reason for the heavy equipment requirements of this relatively young industry is the high rate of obsolescence. New machines offer new products, cost less to operate.

The 5000 to 6000 U. S. firms which operate vending machines are constantly shifting older machines to undeveloped locations, putting new models into sites where sales volume is highest. A new model coffee machine, for example, brews a fresh cup of coffee every 6 seconds. Older models mixed powder or coffee syrup with water.

In a partial effort to beat the obsolescence factor, one manufacturer is working on a multipurpose machine which could sell a number of different items. But obsolescence is still important in boosting sales.

Export Sales Good—Third factor behind vending machine sales is the export market. While many industries suffer from imports, U. S. vending manufacturers are boosting shipments abroad. It's still not a major market, but it's expanding rapidly. A total of 33,776 U. S. vending machines went abroad in 1958. In 1959, 44,142 machines were shipped.

One vending machine executive comments, "Sure, they build vending machines in Europe. They built hot food machines before we did. But over there it's still a handicraft business. I've seen some of their plants. They can't meet demand in their own market."

Are Foundries Next For Oxygen?

First foundry use of oxygen will probably take place in an integrated steel mill.

Under certain conditions, it might offer advantages over electric arc furnaces.

▪ The oxygen process, fastest growing method for making steel, is now getting a long, hard look from steel foundrymen.

In a study of the possibilities, John Crane and F. E. Van Voris, Union Carbide Metals Co., suggest, "In all probability the first foundry use of the basic oxygen furnace will occur in the steel foundry within an integrated steel plant having a source of hot metal and low-cost, tonnage oxygen."

But most steel foundries are not in steel mills. To probe the possibilities for basic oxygen in these, the Union Carbide engineers considered two hypothetical, 100-ton-per-day foundries. They set them in the Philadelphia area to fix material cost.

Their comparison was between a water-cooled cupola supplying hot metal to an oxygen furnace, and a single-slag electric furnace shop.

Advantages for Each — Advantages of the arc furnace operation are: foundry operators are familiar with this so no new skills are needed; all ranges of carbon and alloy steels can be made; alloys in the scrap can be recovered; ease of shutting down and starting up; and good temperature control methods are well established.

Advantages noted for the cupola-oxygen operation: By adjusting the analyses the cupola can make hot metal for steel refining as well as grey and ductile iron; the oxygen furnace can make all carbon and alloy steels except stainless; since power is not a factor the foundry can operate day or night without regard to peak-power periods; and small heats (3 to 8 tons), more rapidly made, mean a more continuous flow of metal to the casting floor.

Cost Comparison — The capital cost would be almost the same for installation of an electric arc furnace and auxiliaries as for the cupola-oxygen equipment. Cost of an electric furnace per annual ton would be about $20.20, and the oxygen-cupola furnace about $22.80.

In operating expense, electric arc also appears to have a slight advantage. Figuring the cost of metallic charge, coke, fluxes and direct labor (but not counting such as amortization, interest, and insurance), the cost per ton of metal from an electric furnace is about $57.03, compared to $59.09 from an oxygen furnace. However, there are variables.

Power is a major variable. The Union Carbide engineers figured their hypothetical electric furnace would need 510 kw hours per ton, while power requirement of the cupola - oxygen operation is negligible, used only for auxiliary equipment.

Oxygen's Prospects—Oxygen cost is another variable. The hypothetical cupola - oxygen operation would need about 3.5 million cu ft per month. This would cost about 30¢ per 100 cu ft, if this were the only oxygen needed. However if more were used, unit cost would drop sharply.

And a steel foundry which already had a cupola would make some slight saving in capital cost. Mr. Crane says most likely the existing cupola would be too small. But a new one could use the auxiliary equipment of the first unit.

Is Business Headed Up or Down?

At the Worst, a Mild Recession Is Ahead

The business picture is clouded by contradictory indicators. Steel decline is a principal factor.

A mild recession or correction is the best guess of what's ahead.—By Tom Campbell.

■ At no time in recent business history has there been so much public and private disagreement among economists. And mixing their confusion with disagreement among business men, one gets more uncertain as to the real outlook.

The breakup of the Summit has caused some optimists to gallop off with predictions of booms to come. Those who said "I told you so" on the cold war are sure defense spending is poised for a takeoff. Well, just what is the near-term and intermediate outlook for general business?

Boomlet Is Over—For one thing, the boom that started late in 1958 is over. Peaks in major activity were reached anywhere from one to twelve months ago. But the steel strike scrambled all statistics and made forecasting a little more vulnerable than usual.

Then there is the case where industry has been geared to such a smooth-running efficiency that targets are reached faster and more precisely than even the optimists had figured. That was the case with the steel recovery.

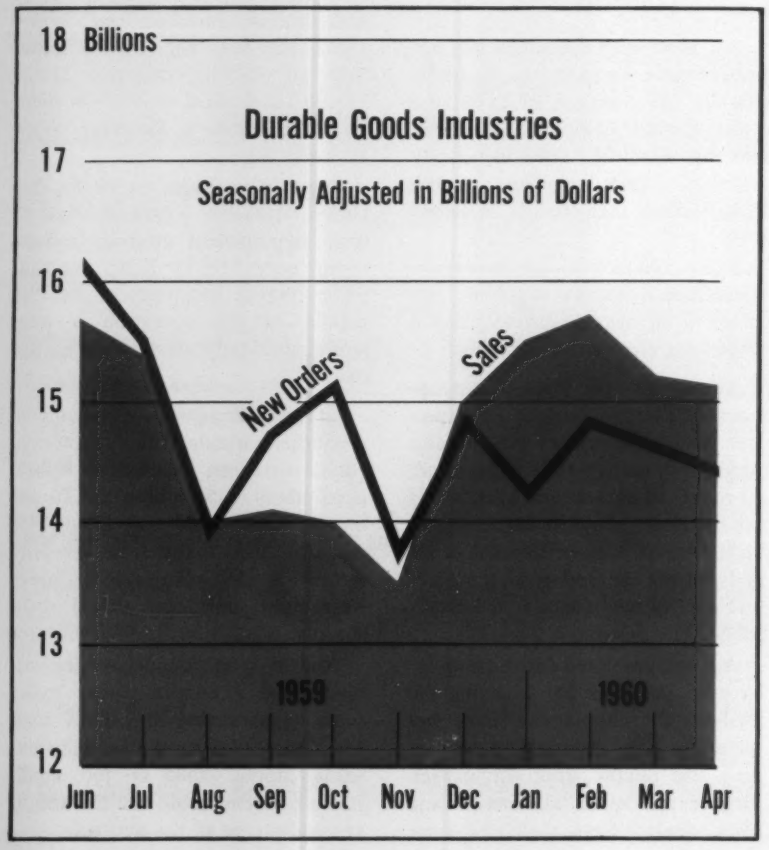
Inventory Factor—Most serious students of the steel industry had expected inventory building to keep at a good pace until at least the latter part of June. Along with hard-bitten steel managers, they expected that inventories would be built to at least 18 or 20 million tons. These estimates were wrong on both counts.

The steel industry poured the steel out in such a stream that inventories became adequate last March—and in some cases before that. So since March, the inventory-cutting spree has been going on. The pace gained its greatest speed in May. While many steel users did not actually cut stocks in March, they did defer orders and refrained from placing fresh orders. This had the same ultimate effect as cutting back inventories.

Recession Unlikely—The severe drop in steel order volume—to be followed by a severe drop in steel output—has been steeper than any since 1954. The suddenness of this turnabout in steel is only now losing its surprise impact. It is well that other activity in the business world did not take the present time to become deflated. That alone is one reason why the business picture shows no sign—yet—of an imminent recession.

The bottom in the steel order outlook is at hand this week. If the summer doldrums weren't upon us, the steel order rate and, later, production rate, would be on their way up. But because of seasonal factors, vacation shutdowns, and the momentum of inventory cutbacks, it will be a few more months before

Orders Drop Behind Sales



steel operators can breathe easier. (For more on steel, see P. 70.)

Far-Reaching Effects—The crash in steel activity had its impact upon car-loadings, refractories, coal, and coke operations. It has affected hundreds of lines dependent upon high-level steel output. Not the least is the number of layoffs of workers who just recently went back to work after a 116-day strike. And for those who were not laid off, there are four and three-day week work schedules.

But the economy has shown a toughness not expected by the more serious chart scanners. It appears now, that if a general deflationary movement has started it is so slow in movement and so weak in structure that it won't be noticeable for quite some months into the future.

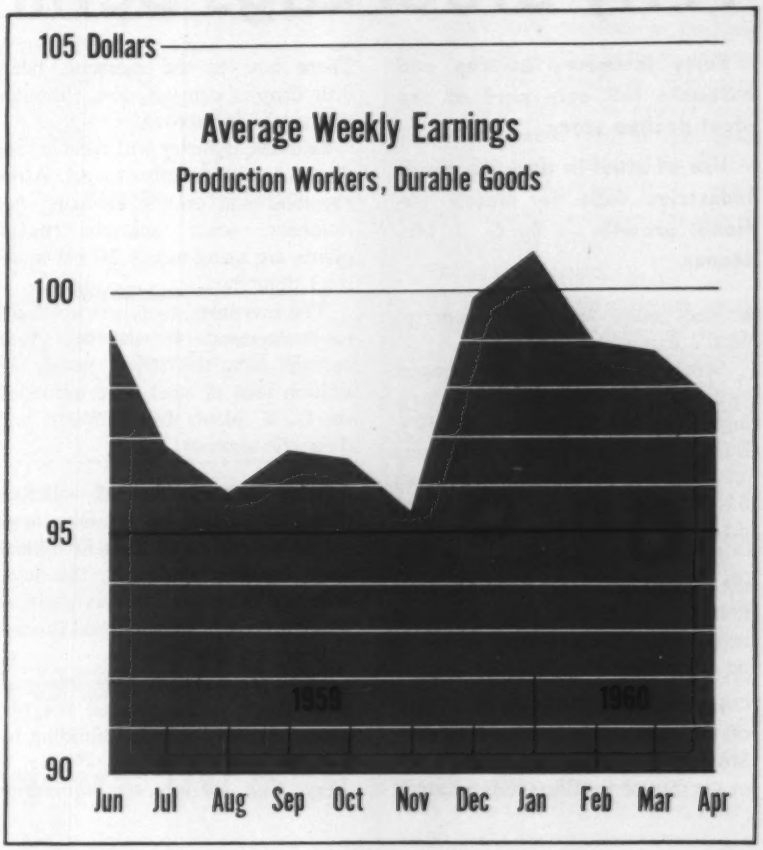
Defense Probabilities — Whether or not the cold war aspects of the current world outlook will jazz business a little is a question. There is no reason to expect an immediate moderate war hysteria in the buying areas of durable goods. Certainly steel users know they can get anything they want when they want it. If they all decided to up their steel orders at once, this would not be the case. But short of a shooting war in Berlin or in Asia, it is unlikely that the mass of steel users will reverse its field soon.

It is more likely that if the cold war gets touchier, and a little more unpredictable, steel users and others will start to restudy their buying and inventory habits.

Look Sharp—There is no doubt at all that so-called sharp buyers of goods are doing more quiet checking than most industrialists. But they are unworried about availability of steel, aluminum, copper, machine tools, freight car space, construction materials, stamping capacity, and engineering design time.

On a classical basis, the economy should now be ready to enter a mild corrective period. We say "mild" because activity since the start of the boom in 1958 has not been ragged or over-extended. The steel strike, in reality, took some of the bang out of the boom.

Will Earnings Decline Hurt?



There are still some confidential worries about the economy in 1961. Recessions have not been banned. Business cycles will continue for many more years even though they may not be as brutal as they were in the 1930's. The high unemployment rate is a worry to economists, as is the month - to - month drop in the average number of hours worked by blue shirts and the cumulative effect of the layoffs in steel and kindred industries.

The main source of worry among businessmen, politicians, (the "ins"), chartists, optimists, and Federal officials is the inability to even make a stab at reading the current indexes correctly.

What's Ahead — But here goes: The boom is over. We are in a gentle leveling off phase for the entire basic economy. Consumer goods and services will reach new highs this year—in sales, that is. Auto output will reach 6.2 to 6.5 million domestically — which will mean a smaller output next calendar year. Construction will about meet last year's record or be about 5 percent lower, mostly due to the continuing drop in housing starts. These will be less than 1.2 million this year, but the trend line will start up late this year or early next year.

Since retail sales, services, government spending and operations constitute about 75 percent of our weight in indexes, the economy—either late this year or early next year—will reflect no more than a mild recession or correction. And the whole picture may change for a fast turnaround if fireworks begin at Berlin or in Asia.

One thing sure: No matter who is elected President, his election will not dramatically affect the course of business.

Why Steel Lags Behind Economy

Early inventory buildup and cutbacks tell only part of the steel decline story.

Use of steel in durable goods industries fails to match national growth. — By G. J. McManus.

■ Steel mills are still wondering what's happening to them.

Seven months after the longest steel strike in contemporary history, ingot rates are headed into the 50's. But at the same time, steelmakers read that the Gross National Product has climbed over the $500 billion mark for the first time in history.

In the past, steel has moved with the overall economy. Now, the steel industry is dropping to recession levels while the economy seems to be expanding.

Inventory Cuts—Immediate cause of the reversal is not hard to find. Steel users are liquidating inventory at the rate of 1 million tons a month. There has, at the moment, been little drop in consumption, although that might come soon.

In June, industry will receive less than 5.5 million tons of steel. After checking and double checking the numbers, some analysts insist plants are using nearly 20 pct more steel than they are ordering.

The inventory switch is not hard to understand. In the first four months after the strike, nearly 32 million tons of steel were unloaded on U. S. plants from foreign and domestic sources.

Why Cutbacks Started — Before plants could turn off the flow, steel stocks totaled more than 17 million tons. By past standards, this level was not excessive. But as early as March, P. A.'s were offered prompt delivery on spot lots.

With steel readily available, and with labor peace assured for two years, industry stopped building inventory and began liquidating in May. The analysts say liquidation can last no more than two months, that the operating rate must rise to at least 70 pct when the slashing stops.

Underlying Reasons — All this seems a reasonable explanation of the current steel slump. Probing deeper, however, some steelmakers find disturbing implications. Why was the industry able to rebuild inventories so rapidly?

Steel capacity has increased 60 pct since 1946. Foreign steel has helped unbalance the situation.

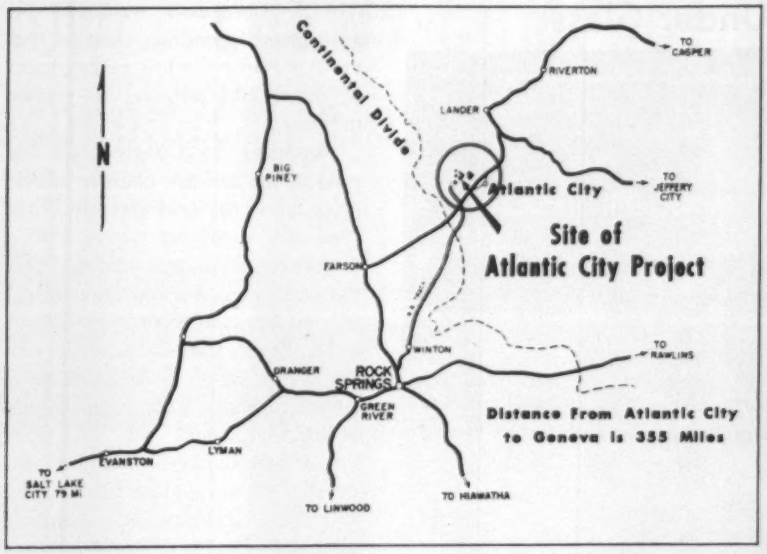
But the big problem does not seem to be that supply has increased too rapidly. The trouble is, demand has grown too slowly.

Consumption Levels—The last five years has seen practically no increase in steel consumption. In the current year, domestic plants are expected to consume 80 million tons of finished steel. Steel consumption was 79 million tons in 1955; 78 million tons in 1956.

What's Happened to Steel Production

Millions of Net Tons

	Steel Capacity	Ingot Rate, Pct.	Steel Shipments	Exports	Imports	Domestic Steel Receipts	Domestic Consumption
1949	96.12	81.1	58.1	3.51	.29	54.9	—
1950	99.99	96.9	72.2	2.56	1.01	70.7	—
1951	104.23	100.9	78.9	2.76	2.17	78.4	—
1952	108.59	85.8	68.0	3.27	1.18	65.9	—
1953	117.55	94.9	80.1	2.68	1.67	79.2	—
1954	124.33	71.0	63.1	2.53	.78	61.5	—
1955	125.83	93.0	84.7	3.58	.97	82.1	79
1956	128.36	89.8	83.2	3.62	1.33	80.9	78
1957	133.46	84.5	79.9	4.56	1.15	76.4	77
1958	140.74	60.6	59.9	2.42	1.70	59.2	70
1959	147.63	63.3	69.3	1.40	4.40	72.3	73
1960	148.00	80.0	84.0	2.00	3.00	85.0	80



DOWN-HILL RUN?: Iron ore pellets from U. S. Steel's planned facility, about 8300 ft above sea level in Wyoming mountains, will be shipped to the company's Geneva Works near Provo, Utah—355 miles away.

U. S. Steel Plans Expansion in West

▪ A major new iron mining and beneficiation facility will be constructed in Wyoming. J. D. McCall, president of U. S. Steel Corp.'s Columbia - Geneva Steel Div. says construction will start immediately in Fremont County.

The facility will consist of extensive ore mining, concentrating and pelletizing operations. When completed late in 1962, it will be able to produce about 4000 tons of high-grade pellets per day. The pellets will be shipped 355 miles to the company's integrated steel plant at Geneva Works, near Provo, Utah. The ore will supplement present sources near Cedar City, Utah.

Planning Ahead — Mr. McCall points out that: "The availability of this source of iron ore will place Columbia - Geneva in an excellent position to meet the future demands for steel by our growing Western population."

Location of the facility, known as the "Atlantic City Project," is 8300 ft above sea level in Wyoming's Wind River mountains.

In addition to open pit mining operations, major units to be built include crushing and screening facilities, an ore concentrating plant, a pelletizing plant, an extensive water storage and handling system, and loading and shipping facilities. Office, maintenance, warehouse, laboratory and other buildings also will be constructed.

Double Iron Content — Conventional open pit mining methods will be used to mine the ore which contains about 30 pct iron. After crushing, the ore will be conveyed to the concentrating plant where it will be magnetically concentrated to more than 60 pct iron. Ore concentrate will finally move to the pelletizing plant for forming. Then it's ready for shipping.

Steel Warehouses Reduce Prices

Competitive pressure is pushing down steel service center prices. Several price reductions, involving either base prices or extras, were made last week. While the base price cuts were centered in Philadelphia and Charlotte, N. C., they reflect warehouse price weakness throughout the U. S.

The changes were:

(1) Reduced item quantity extra charges in two tonnage brackets, those involving small lot orders, by all national branches of Joseph T. Ryerson & Son, Inc. (2) Base price reductions, varying from $5 to $10 a ton, made at Philadelphia by Edgcomb Steel Co. and matched by Ryerson. (3) A $2 a ton reduction in quantity extras on orders between 10,000 and 20,000 lbs at York and Phila., Pa., also by Ryerson and Edgcomb.

New Schedules — The Ryerson reduction in quantity charges on small-sized orders will become effective at all locations within the next few days, the company said. They were effective June 1 at Pittsburgh and Chicago warehouses.

The new schedules set a quantity extra charge of $1.75 per 100 lbs for all items under 1000 lb. Previously, the extra was $4 per 100 lb for items under 100 lb and $3 per 100 lb for items from 100 lb to 399 lb. The extra for items from 399 to 999 lb remains at the previous $1.75 per 100 lb. The new rates apply to hot-rolled products, galvanized, and cold-rolled sheets.

The changes reflect market conditions rather than cost reductions, a Ryerson spokesman noted.

"Lean Margin"—He added that "the revised schedule of extras will result in a very lean margin of profit, especially in view of the current low volume of business."

Ryerson apparently moved to meet competition in the Philadelphia area with the cuts in base prices. The reductions varied from $5 to $10 a ton on hot-rolled bars, strip, sheet, plates, and I beams.

A Look at the World Under Glass

TOP FLIGHT: An IBM engineer inspects a glass hemisphere globe, part of a new navigation system. The experimental system can project a highly accurate circular map of an area 400 miles in diameter. Using it, a pilot of a supersonic plane will be able to tell his location over the earth by glancing at his instrument panel.

Soviet Buying Pace Stays High

Soviet buying of U. S. machinery is continuing at a high level, despite the new war-like threats from the Kremlin.

New government figures show that the U.S.S.R. bought $35.4 million worth of U. S. equipment during the first three months of this year. The Reds had sought approval in Washington for $42.5 million worth of goods, but the Administration struck $7 million worth of military or strategic items from the Red shopping list.

Both the volume of goods sought and the amounts actually purchased are all-time highs, indicating sharp Soviet interest in buying all the machinery and capital goods from the U. S. that our laws and their credit allow.

ICBM Program Criticised

Congressional auditors have accused the Air Force of losing control of its $2 billion a year Intercontinental Ballistic Missile Program.

The General Accounting Office (GAO), Congress's watchdog on government spending, charged that the Air Force has lost management of the ICBM program to private industry.

Reporting to Congress on the state of the nation's ballistic missile program, GAO said the Air Force "has to a significant degree shifted a portion of its responsibility for the success of this crucial program to a private contractor."

The report recommended that the Air Force drop a long standing contract with Thompson Ramo Wooldridge, and its subsidiary Space Technology Laboratory, and develop its own team to "provide systems engineering and technical direction" for the ICBM program.

GAO said that while the arrangement with Thompson Ramo Wooldridge "was appropriate as an expedient, we believe it evident that it does not best protect the interests of the government in a long-range program."

New Medical Plan Drafted

The House Ways and Means Committee has refused to load up the Social Security program with added benefits for the aged.

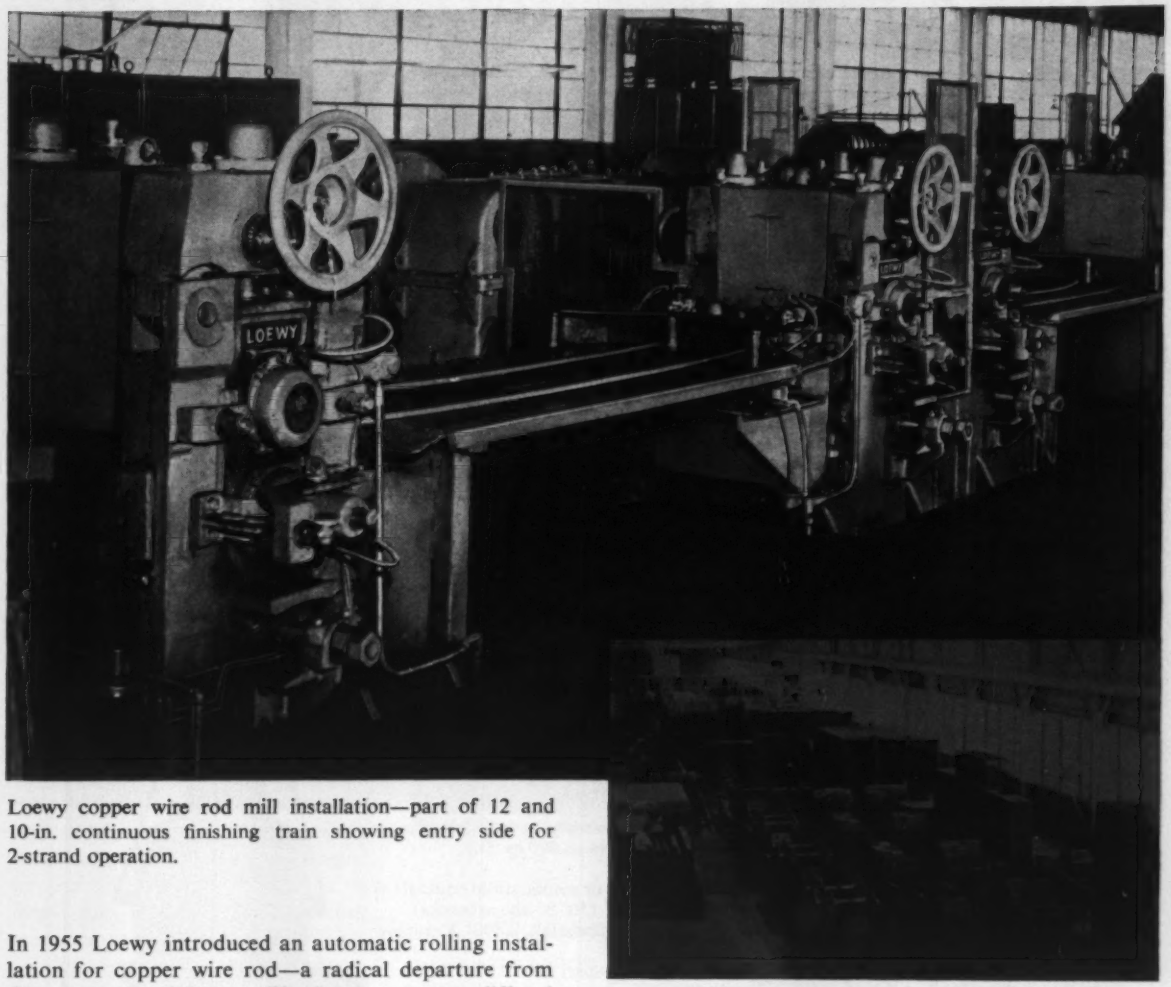
The Committee handed organized labor a setback by rejecting its plan to expand Social Security benefits into the new field of medical care.

It also rejected a plea from most of its Republican members that all persons 72 years old and older be put on the benefit roles of Social Security.

On the medical care issue, the Committee drafted its own plan that would extend government-subsidized medical care to about 1.5 million needy persons over 65. This limited plan would be paid for under matching formulas between Federal government and states.

The rejected Republican proposal, which was not supported by the Eisenhower administration, would have provided the Social Security program's minimum cash benefit of $33 a month to 2 million persons not now covered.

NOW! "LOEWY-COMPACT" MILLS for the economical production of copper wire rod



Loewy copper wire rod mill installation—part of 12 and 10-in. continuous finishing train showing entry side for 2-strand operation.

Overall view of 14-pass continuous Loewy wire rod mill

In 1955 Loewy introduced an automatic rolling installation for copper wire rod—a radical departure from the conventional layout. The Loewy concept differed fundamentally from the customary looping stand, which was serviced by tong men and required a considerable crew of highly skilled operators. Loewy has now taken another major stride.

The new "Loewy-Compact" mill features remarkable compactness and automation, optimum precision, and highly economical design. Heretofore it was considered uneconomical to roll smaller quantities of copper wire rod. The capital investment and the space requirements involved in a continuous wire rod mill seemed prohibitive for companies of limited size or those restricted in plant area.

Studies have demonstrated that wire rod in smaller quantities can be profitably produced on this new Loewy wire rod mill.

Avail yourself of our services in order to hold your own in the competitive market. Write Dept. A-6, outlining your requirements.

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Harris Model 30 Batch Incinerator

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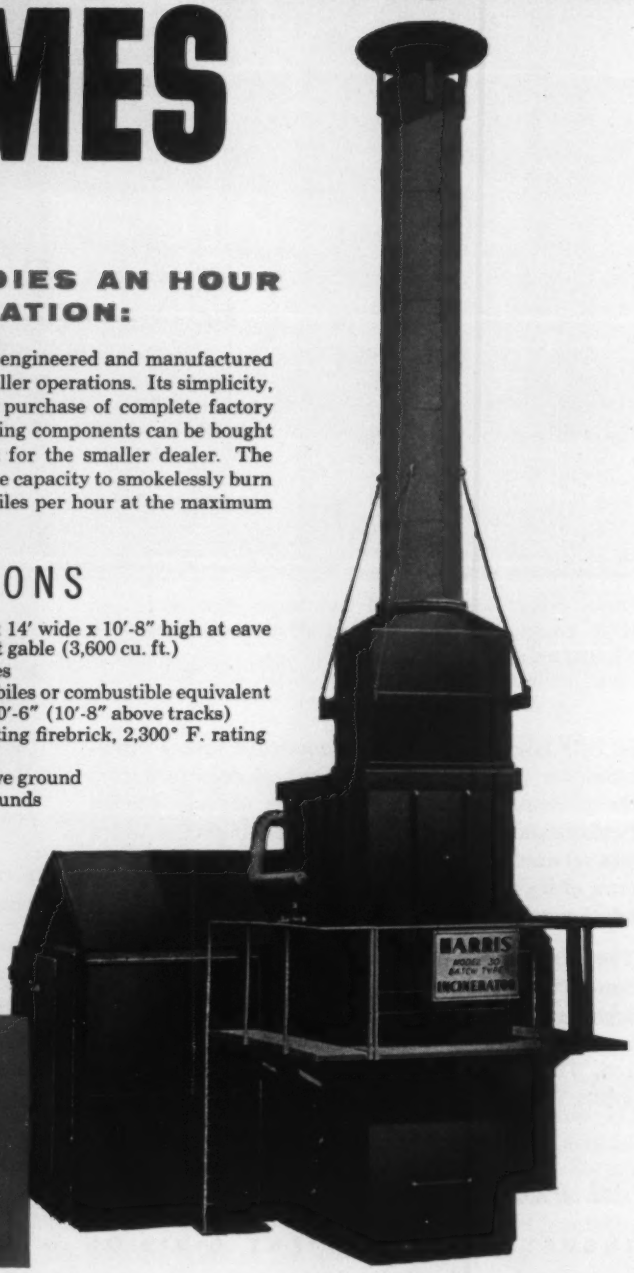

HANDLES 4 AUTO-BODIES AN HOUR ...CONTINUOUS OPERATION:

This first of a complete line of incinerators being engineered and manufactured by Harris is intended to meet the needs of the smaller operations. Its simplicity, overall cost, and flexibility of installation permit purchase of complete factory built unit, or if you prefer, the major and controlling components can be bought separately. This provides an ideal arrangement for the smaller dealer. The exceptionally effective afterburner provided has the capacity to smokelessly burn all combustible matter, except tires, in 4 automobiles per hour at the maximum firing rate of 40 gallons of #2 fuel oil per hour.

SPECIFICATIONS

Kiln size	20′ long x 14′ wide x 10′-8″ high at eave 14′ at gable (3,600 cu. ft.)
Burning time	25 minutes
Hourly capacity	4 automobiles or combustible equivalent
Door openings	11′-0″ x 10′-6″ (10′-8″ above tracks)
Afterburner lining	9″ insulating firebrick, 2,300° F. rating
Stack diameter	36 inches
Stack height	35 ft. above ground
Estimated weight	55,000 pounds

Talk with a Man from Harris

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Edwin C. Barringer

He Served the Scrap Industry

After 21 years of active leadership Edwin Barringer retired as executive vice president of the Institute of Scrap Iron and Steel.

His record, an outstanding one, shows great insight into the problems of the industry.

E. C. BARRINGER: He led without seeming to lead.

■ On April 30, 1960, Edwin C Barringer retired as executive vice president of the Institute of Scrap Iron & Steel.

For 21 years, Mr. Barringer has been "leading without seeming to lead" the association for the scrap iron and steel industry in its ups and downs through two wars and a series of recessions to where it is today—a $2 billion industry, fifth largest in the United States.

Accomplishments Outlined—In a letter last year to a prospective Institute member, Mr. Barringer listed two dozen promotional, technical, and administrative past and present functions and activities performed by the Institute of Scrap Iron & Steel for its members. Without meaning to, in listing the many-faceted activities of the Institute. Mr. Barringer was almost citing a brief business biography of his own 21-year career with the association, one dedicated to service to the scrap industry.

A work day beginning at 7:30 a. m and often ending at 6 p. m., and a travel schedule of 30,000 miles a year, kept Mr. Barringer on top of his job—and ever sensitive to the needs of his industry.

The Writer—He could be termed an expert in written communications and was the author of the book "The Story of Scrap," numerous Institute Yearbooks, and other publications.

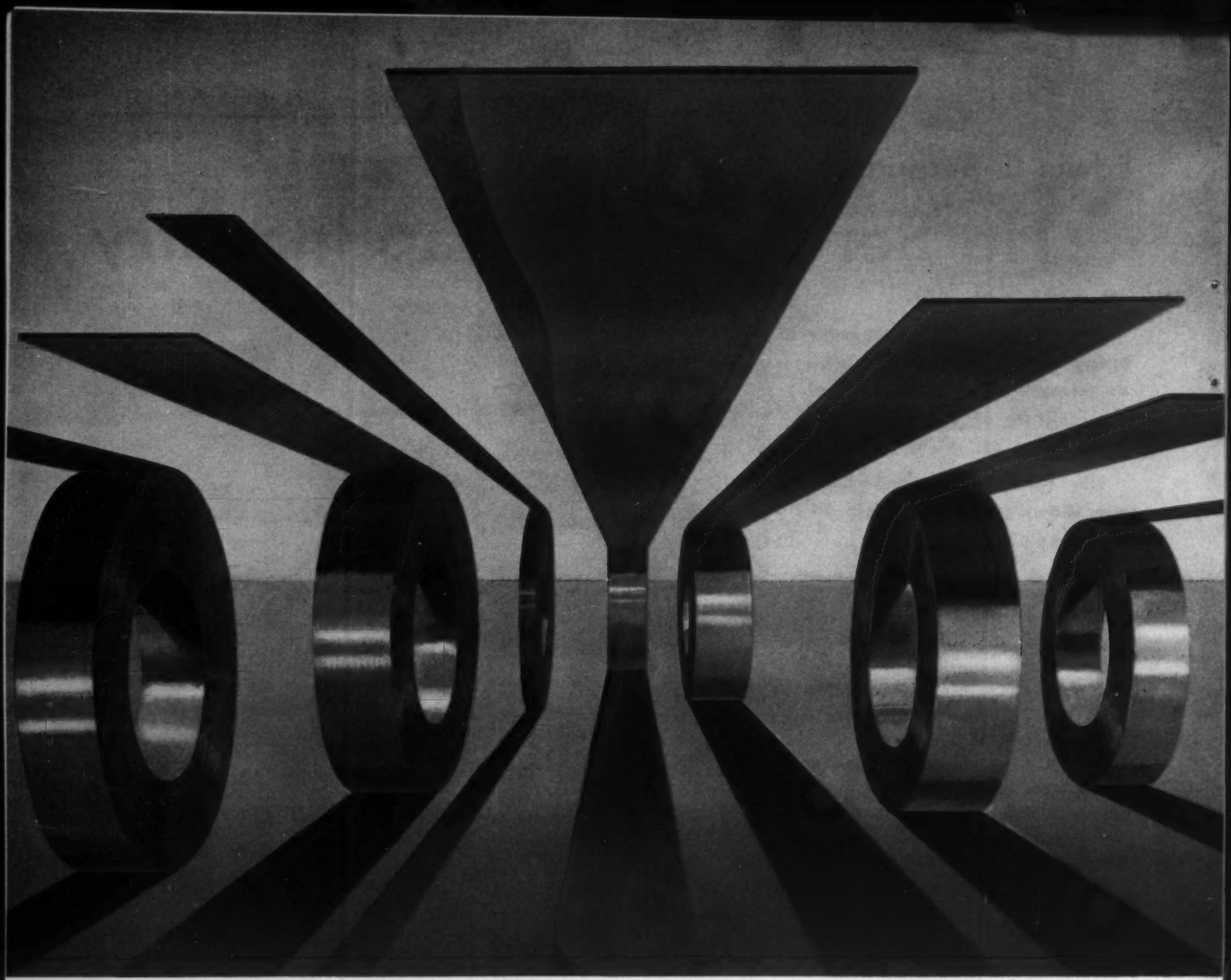
Mr. Barringer began his business career after college in Cleveland by serving as a city hall and political reporter for daily newspapers in Cleveland and Columbus, Ohio. Then, for 21 years, he was a writer and editor of trade papers and magazines serving the iron, steel, and foundry industries.

Service Record—Since 1938, Mr. Barringer has been either executive secretary or executive vice president of the Scrap Institute and, in the war period from 1942 to 1946, he was president of the Institute.

Representing his industry, Mr. Barringer served as a member of the War Department's Overseas Mission on Scrap in 1945. He was also a consultant on scrap to the Bureau of Mines and the National Production Authority.

Mr. Barringer often said sincerely that "the scrap iron and steel industry is a fascinating industry, and I have had 21 very rewarding business years being associated with it."

Long List—Some of the things that were set up during Mr. Barringer's association with the institute include: Annual safety program and contest; group life and accident insurance program; week-long seminars for junior executives of the scrap industry; a program for disciplining obvious violators of specifications and business ethics, and numerous other programs.



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When J&L Precision strip is ordered to exacting specifications, you can be sure that your specifications will be met . . . inch after inch, coil after coil, time after time.

The dimensional accuracy of J&L strip steel, consistently maintained, offers many cost-saving advantages. This means fewer rejects; fewer production problems; less down-time for tool adjustment. This means that you are getting the steel you pay for . . . in terms of maximum product yield per ton.

How?

By delivering the steel you order . . . to your specifications . . . J&L helps you to achieve optimum production with control of in-plant fabricating costs.

The experience, facilities, and accumulated know-how of a specialized organization . . . directed exclusively to the processing of low carbon, high carbon, alloy, tempered and stainless strip steels . . . are available to work for you. For assistance in solving your problems, call your J&L Stainless and Strip Division representative; or write to Dept. 233-Y—610.

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Sverdlovsk and the U-2 Incident

■ If you have never been to Sverdlovsk, some of the overtones of the U-2 incident may seem exaggerated beyond reason. And if you have only a nodding acquaintance with the operational ceilings of U. S. aircraft, its impact on the Kremlin and on the Russian people may not be too obvious.

In the United States, the pressures for more defense spending have increased. The entire economy, and metalworking in particular, may feel the effects. (See P. 68.)

A Shattering Blow—Just two years ago I visited Sverdlovsk, toured its huge machinery building shops and the modern steel mills in the Ural area. In the friendly atmosphere of the time it was possible to talk to many of its citizens of their feelings about America, their hopes and their fears.

When you put this all together, you have a new awareness of what happened there. First, you must know that this city in the Urals, some 1000 miles east of Moscow, is the site of Russia's largest machinery works: the Uralmash Machinery Building Plant. It covers 500 acres, employs 16,000 workers, makes steel mill and mining machinery. At the time of our visit, Uralmash was building a 33,600-ton forging press.

Showplace Plant—Further, within 250 miles of Sverdlovsk, are mills that roll about 15 pct of Russia's steel—including the USSR's showplace plant at Magnitogorsk. Best estimate is that Magnitogorsk made over 7 million ingot tons last year. The U-2 apparently flew fairly close to that plant.

It is hard for an American to realize that the Russian people are actually afraid we will attack them. Talk to any Russian long enough and you'll be asked, "Why do you have bases surrounding our country . . . why have you exploded so many atom bombs?"

The fact that America's U-2 reconnaissance plane was captured near one of Russia's major metalworking centers adds a perverse twist to a fantastic case.

For the background of this report, G. F. Sullivan, editor of The IRON AGE, draws from his personal experience on a visit to Sverdlovsk. He was a member of an official U. S. mission to that Siberian metalworking center.

Invincible? — For internal purposes, the Communists built up this fear and now it has come home to haunt them. The masses were led to believe that the only thing between them and an American attack were the "invincible" Russian defenses, aircraft and antiaircraft.

The shattering of that myth seems to have forced an agonizing reappraisal of Soviet internal politics. For here was an American plane in the very heartland of the Soviet Union.

A Shock to the Kremlin?

Another thing the Kremlin knows —and you can be reasonably sure that the Russian people don't know —is that the United States has at least three interceptors with reported operational ceilings in the 60,000+ ft range. They are the F-104 (like U-2, by Lockheed), the F-105 (Republic) and the F-106 (Convair).

Service ceiling of the B-58 bomber (Convair) is listed as 50,000 ft, but the Kremlin may think that an understatement. It is.

Aircraft Gap?—Failure—over a 4-year period—to shoot down previous U-2 flights either with fighters or rockets shows that Russia has no interceptor comparable to ours. And it may not have a good high altitude rocket either.

Those of us who worried about the missile gap can now see that what we thought was complacency was actually quite the opposite. And the speed with which the U-2 was designed and put to work shows what industry and government can do when the chips are down. A similar crash program on reconnaissance satellites could do wonders in that area too!

Don't Overlook The Positive Angles

The Summit was doomed long before the U-2 fiasco. We are due for some very serious crises. But the incident has its plus values too.

For one thing, the White House The Pentagon, and the CIA know more about Russia and its capibilities than most people gave them credit for.

For another, Mr. Khrushchev has unwittingly exposed a bright new facet of American engineering and production genius. For America—and for its industrialists selling abroad — this is not at all bad.

G. F. Sullivan, Editor.

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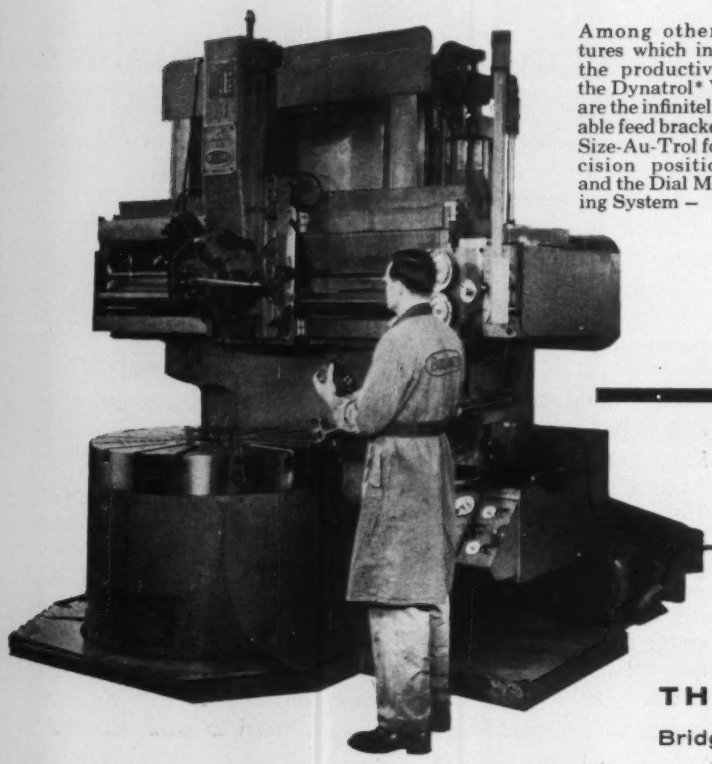
Directional control of all head motions in feed on traverse, either horizontally, vertically or at any 45° angle, as well as table start and stop from a lightweight portable pendant, is a distinct production advantage.



Among other features which increase the productivity of the Dynatrol* V.T.L. are the infinitely variable feed bracket with Size-Au-Trol for precision positioning, and the Dial Measuring System –

It allows the operator to always be in the most advantageous position in relation to the work and eliminates the necessity of climbing for buttons or levers. By reducing operator fatigue and increasing his efficiency, more metal is removed per hour with a lower cost per piece.

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YOU CAN'T BEAT A BULLARD

New Muffler Stirs Controversy

AMC Will Use Ceramic-Coated Exhaust System in 1961

Longer life is expected of ceramic-coated exhaust system to be used on 1961 Ramblers.

Other automakers will wait for results before deciding to say "me, too" or "I told you so." —By A. E. Fleming.

■ In disclosing that all 1961 model Ramblers will have ceramic-coated exhaust systems, American Motors Corp. is causing wonder among other car makers and various muffler manufacturers.

AMC's competitors insist they haven't been caught napping. But they don't think ceramic processing is worth the added cost. Muffler producers are somewhat skeptical. They say they have checked into ceramics. But they aren't sure the process has been perfected.

A Rambler First—Rambler will be the first and only domestic car maker to use ceramic-coated mufflers and tail pipes next year.

AMC, Walker Manufacturing Co. of Racine, Wis., and Bettinger Corp. of Milford, Mass., developed the ceramic system during three years of joint effort. It was first used for military jet engines, and since has been used by some truck makers including The White Motor Co.

General Motors Corp., Ford Motor Co., Chrysler Corp., and Studebaker-Packard Corp. are committed to steel, galvanized or aluminized mufflers on 1961 models. They could make running changes to ceramic in the middle of their model runs. But it isn't likely since it would be very costly.

Why Change?—Why is American Motors making the switch from aluminized mufflers next fall? In answering for the company, E. W. Bernitt, vice president of automotive operations, says, "The development is in line with our basic policy of greater product durability, quality and serviceability."

A sales official for another car company says it is, in part, another good piece of publicity from the offices of AMC president George Romney. "Romney is a great believer in the 'better mousetrap' philosophy," says this critic, "and he'll be sure to wring the last drop of publicity out of this ceramic thing. Watch and see."

Maybe so. But nothing can be taken away from AMC for going out and spending more money for a product it believes is superior to those now on the market. It's a reversal of most automotive thinking.

Cost Controversy — The cost of ceramic coating is controversial at this stage. "It's not as much above conventional coatings as you'd think," says a Bettinger employee who has been involved in the project for several years. "It takes less expensive steels to do a good job, and eliminates the cost of aluminizing. Besides, the cost will go down as volume goes up."

An AMC source says the added cost will be $1 to $2 more per car. If this is true, AM would be sinking perhaps $1 million in added muffler costs in its 1961 models if 600,000-unit capacity operations are reached. It is a fair bet that Rambler

Imports Land at Seaway Port

CARS TO CLEVELAND: This load of Metropolitans being unloaded at Cleveland Stevedore Co.'s dock in Cleveland is typical of the cargos entering Great Lakes ports by way of the St. Lawrence Seaway.

buyers would absorb such a cost hike.

No Rash Claims—The indicated $1 to $2 additional cost of the ceramic unit is in line with another report that the cost of ceramic will be as much above aluminized mufflers as aluminized are above steel. It costs auto makers an average of $1.50 more for an aluminized muffler than a conventional steel one.

Higher cost or not, AMC is making no rash claims about the lasting quality of its coming exhaust system. Mr. Bernitt says it should "largely eliminate the need for exhaust system replacement in normal car life." But he cautions that only a long period of time can reveal the actual length of life achieved. Tests show the ceramic coating is fully resistant to emission acids, rust and salt, "indicating a durability far beyond that of present systems."

A Bettinger employee claims he has driven 68,000 miles in a dual exhaust car equipped with a ceramic system without the need for muffler or pipe replacement. He says a warranty policy on the AMC unit has still to be determined, but will be settled in the next few weeks.

How It's Done — Bettinger's ceramic system involves applying ceramic by dipping mufflers and tailpipes so both inner and outer surfaces are coated. The coating is fused to the metal in a continuous furnace at 1500 degrees Fahrenheit.

Bettinger calls the coating Becote 40. It is a blend of borosilicates, clay, borax, titanium dioxide and other refractory materials, and has a blue-gray appearance.

After the ceramic process is completed, a layer of asbestos insulation and a zinc-coated outer cover are applied to the muffler.

To allow proper flow and coating of the liquid on the muffler's inner baffles and tubes, a special muffler had to be designed. This is a factor that some muffler makers consider a major drawback.

Reaction of Others — A vice president of a major muffler company says his company investigated the process some time ago. Sample mufflers were sent to Bettinger. They came back with word that the inside of the mufflers—the chambers through which exhaust gases flow—would have to be redesigned if the ceramic method was to be used.

For the muffler company, this would have required new dies and equipment. "It would have meant a big investment on our part," the official says, "but if the ceramic process proves to be really successful, it'll be an investment we'll have to make in order to stay competitive."

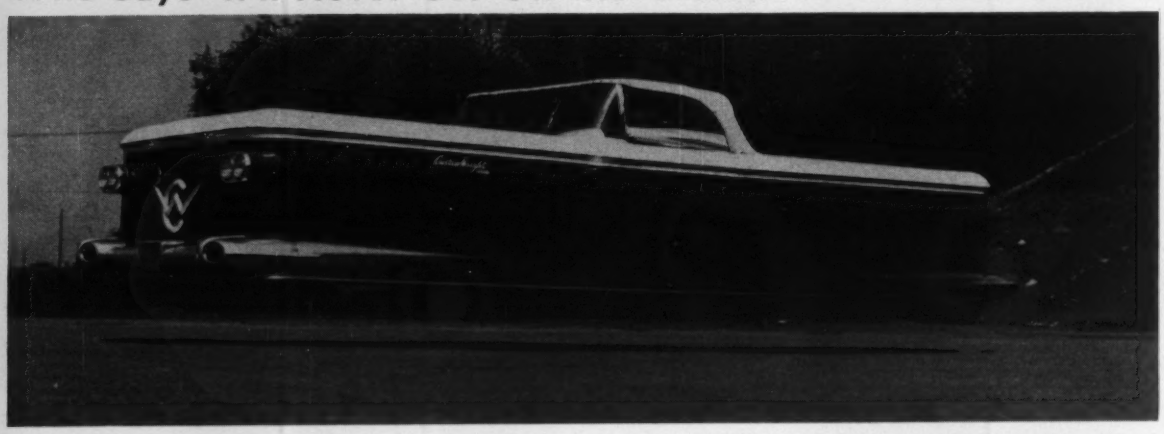
Ceramics Are Tricky—A spokesman for another company which has made ceramic mufflers for trucks says the process is fine if you do a perfect job. But it's tricky.

"Unless you get all the ceramic material out of the inside of the muffler, you'll have headaches," he insists. "Any small ceramic speck that might not get blown out of the muffler will dry up and harden. If the muffler gets jolted, the speck falls loose and starts rattling around inside the muffler. The important thing is making sure you blow out all the excess ceramic matter."

Another muffler expert insists ceramic coating hasn't reached the point where it is fool proof. He says any tiny spot missed in coating will rust right away.

A Little Noisier — He says it's necessary to drill holes in the baffles, for one thing, so all the molten ceramic glass can flow out after the muffler is dipped. "These holes mean you're going to have a noisier muffler. It's all right on big trucks where silence isn't a real important factor. But it might prove awkward to a car maker. Maybe Rambler's willing to sacrifice a little silence for longer muffler life."

Who Says "It'll Never Get Off the Ground?"



UP IN THE AIR: Rubber skirts, made of United States Rubber Co.'s Uscothane, run the circumference of Curtiss Wright Co.'s Air Car which rides on a cushion of air. Skirts also protect underbody of vehicle.

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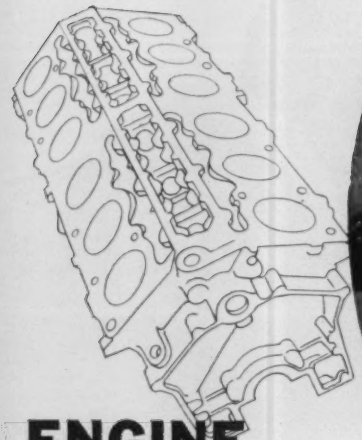

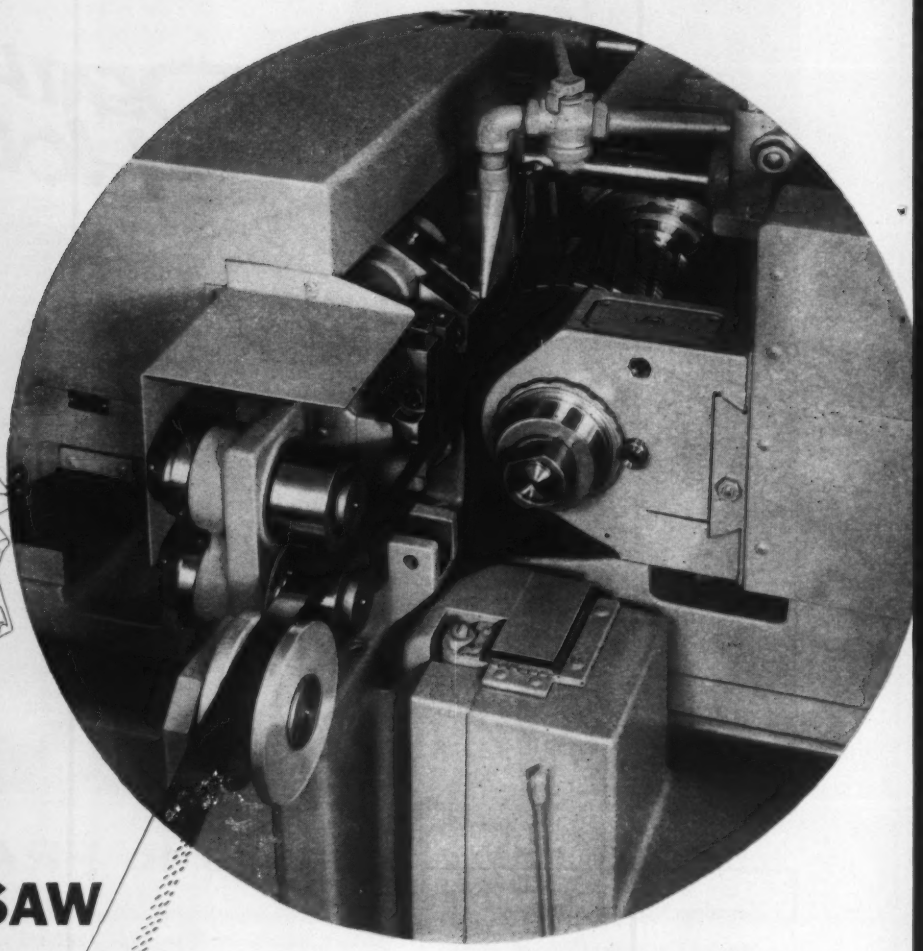

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More Defense Spending Likely

Military Reacts to Congressional Pressure

Prodded by Congress, the military will ask for more funds in coming budget.

If Senate has its way, here's what new defense spending will include.—By G. H. Baker.

▪ When the East-West summit talks collapsed, the Pentagon's first reaction was amazingly bland: "No increases in defense spending are needed."

But the grim reality of bristling relations between the U. S. and the U.S.S.R. is finally beginning to be understood by the military. Result: More defense dollars, plus some shifts in defense emphasis, are in the making.

Push From Congress—In the days immediately following Premier Khrushchev's outburst in Paris, military men insisted to a dubious Congress there was no need adding to earlier estimates of defense needs for the year ahead.

Congress, more responsive to the public's estimate of the Communist threat, began instead to pencil in new and higher figures in the military budget for the year starting July 1.

Finally, the military men caught on. They are now busily recommending new and expanded spending programs of all types for the Army, Navy, and Air Force.

Gates Speaks Out—Defense Secretary Gates set the keynote for the coming buildup immediately upon his return from Paris when he spoke of his "great concern" for strengthening defenses. He also mentioned the urgent need for advancing U. S. missile technology as rapidly as possible.

Senators who attended the closed-door briefings given by Intelligence Director Allen Dulles and other informed Eisenhower Administration officials say the need for missile advances is now imperative.

What to Expect — Specifically, here's what we may expect in the way of beefed-up defense spending programs, if the Senate has the final say in writing the new defense money bill:

Substantial increases in sums for: Polaris (submarine-fired missile), Bomarc (anti-aircraft missile), Atlas (long-range missile), B70s (long-range bomber), a nuclear-powered aircraft carrier, up-dating of some conventional Army weapons and trucks, trading in larger-than-planned numbers of transport aircraft for new models.

More Deficits?—Top defense officials already are letting the word leak out that the existing $41 billion defense ceiling is "impossible" and will have to be pierced soon. They speak not only for funds to be spent in the fiscal year starting July 1, but also for the defense budget for fiscal 1962.

Influence Peddling Crackdown?

▪ Defense contractors who hire retired military officers for the purpose of peddling influence would have their contracts cancelled or funds owed them by the government withheld if the Justice Department has its way.

And if Rep. F. Edward Hebert, (D.-La.), has his way, both the contractors and the officers they hired would face jail and fines for influence peddling.

Stiffer Laws Wanted—Assistant U. S. Attorney General Robert Kramer, testifying before a House Judiciary subcommittee, said a house-passed bill banning influence peddling by newly-retired officers is not tough enough.

Rep. Hebert, chairman of a House group which last year investigated influence peddling, urged the House Judiciary Committee to add criminal penalties for anyone violating the "no selling" provision of the bill. Hebert said both officers and contractors should face fines up to $10,000 and imprisonment for not more than a year if found guilty by a civilian court.

Two Year Limit—The anti-influence bill passed by the House in April requires the court martial of any officer who takes a selling job with a defense contractor within two years after he retires. The officer also would lose retirement pay for two years.

Hebert said such a court martial would end up being a "class reunion." He also believes as much blame should be put on the contractor as the officer.

The Justice Department agrees. Kramer said "there should be some sanctions against the contractor." He said he would not object to imposing criminal penalties, of fines or jail sentences, on contractors violating the ban. But he said withholding government funds from them or cancellation of contracts might be a "swifter and more effective" punishment.

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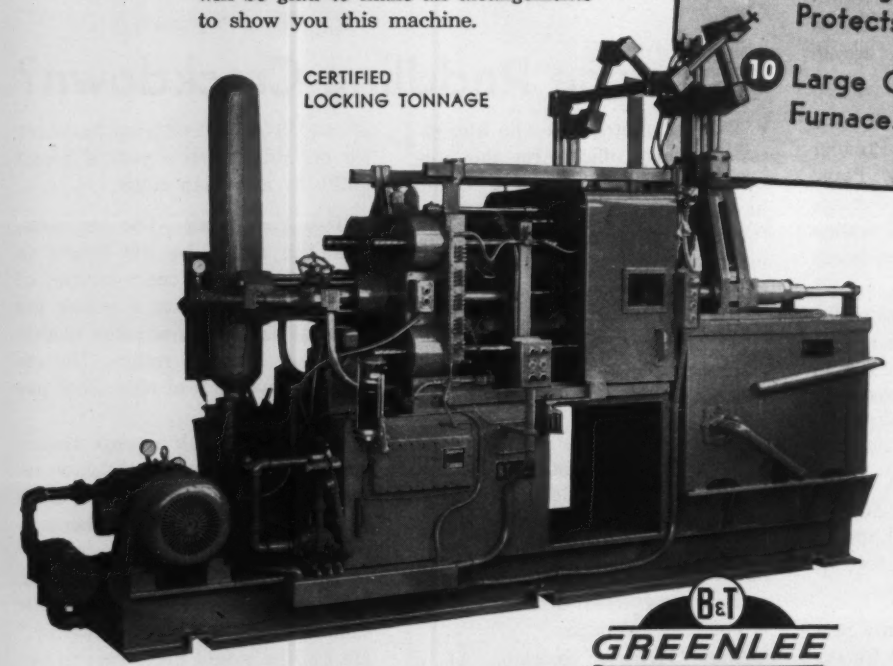

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Tape, Memory Automate Lathe

Warner & Swasey Introduces New System

Automation of turret lathe is one of several new developments W & S will show off at Machine Tool Exposition.

System utilizes electronic memory system and tape controls.—By R. H. Eshelman.

■ One of the really tough nuts for machine designers has been how to automate that old workhorse of production, the turret lathe.

Warner & Swasey Co. apparently has cracked it. Engineers of the Cleveland machine tool builder have devised a unique control system. It utilizes an electronic memory that becomes a tracer after the first piece. It couples tape to add contouring control.

Announced at the firm's 80th anniversary, this new machine is being readied for the Machine Tool Exposition next September.

Research Center, Too—In announcing this development, and the simultaneous unveiling of the company's new research center, Walter K. Bailey, company president, noted, "Right now, almost every machine we build differs radically from the machines we built just 10 years ago."

He adds, "We know from past experience that many machines we will build in 1970 will be entirely different from the machines we are building now. . . ."

How different is this turret lathe? First, the configuration is as far from past machines as the jet is from the 1918 Jenny. The bed, bedways, cross slide, saddle and turret are inclined rearward 20° from the vertical. Joystick controls on the push-button console give simple manual operation. Setup from memory "tracing" merely requires the operator to cut one piece under manual control. Then, he pushes a record button.

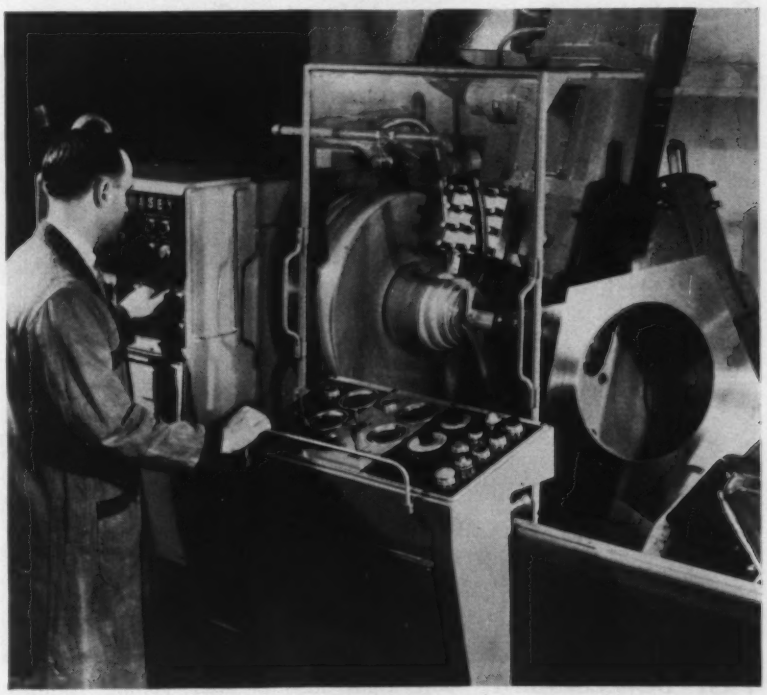
Brain Takes Over—From then on the "brain" takes over. It recalls operations from the electronic memory; cutting cycle is automatic. If contouring is a part of the operation, the automatic controls cut in tape reader at the proper time, cut out after the shape is turned.

From the operator's viewpoint, the beauty of the system is that he can take over at any time to change feeds, speeds, or compensate for tool wear. This means, too, that a change in a single dimension—or several—on a part won't require a new setup, merely recording of changes at the proper point of the cycle.

Easy to Operate—A production expert from a possible customer company present at the demonstration noted that an operator could easily handle several machines.

Warner & Swasey's research and development director S. F. Winchell acknowledged the assistance of industrial design consultant Henry Dreyfuss in incorporating human engineering concepts in controls and appearance.

Marketing officials also revealed plans for a full tape control on chucking lathes.



ON MEMORY: This Warner & Swasey turret lathe can insert into its memory such factors as feed, speed, start-of-cut, length, and dimension of the work. It's done at the touch of a button, following an acceptable cut.

Will Recession Come in '61?

Purchasing Agents Told One Is Possible

U. S. can expect a business turndown next year, speaker tells meeting of National Assn. of Purchasing Agents.

Worries about adequate steel supplies are over, NAPA members hear.—By R. R. Kay.

■ The economy will keep expanding during 1960. But look for a business recession in the spring or summer of 1961.

Money rates have seen their peaks for the next year or two. Steel shortages are a thing of the past.

These are a few of the predictions made at the 45th annual international convention of the National Association of Purchasing Agents held in Los Angeles. Over 2000 members showed up to learn how to do a better job of purchasing

Advance Warning—The country should gird itself for a business recession in about a year. That's the opinion of Dr. Neil H. Jacoby, Dean, Graduate School of Business Administration, University of California at Los Angeles.

However, this former member of President Eisenhower's Council of Economic Advisors, says that he is confident that 1960 will be a good year.

Views on Steel—Oscar M. Miller, manager-primary marketing research, Union Carbide Metals Co., talked about the changing economics of the steel industry: (1) Adequate production capacity; (2) Prices no longer tied to wage hikes.

He told steel purchasing agents that they can now operate on a moderate inventory. It's no longer a must to insure against short supply.

What is a moderate inventory policy? Mr. Miller says it's one that avoids an excessive buildup when business is on the high side. In turn, it avoids drastic cutbacks when business gets slow.

"Under such a policy, you base your inventory on average operating requirements. You would relate your purchases to your near-term fabricating needs," Mr. Miller says.

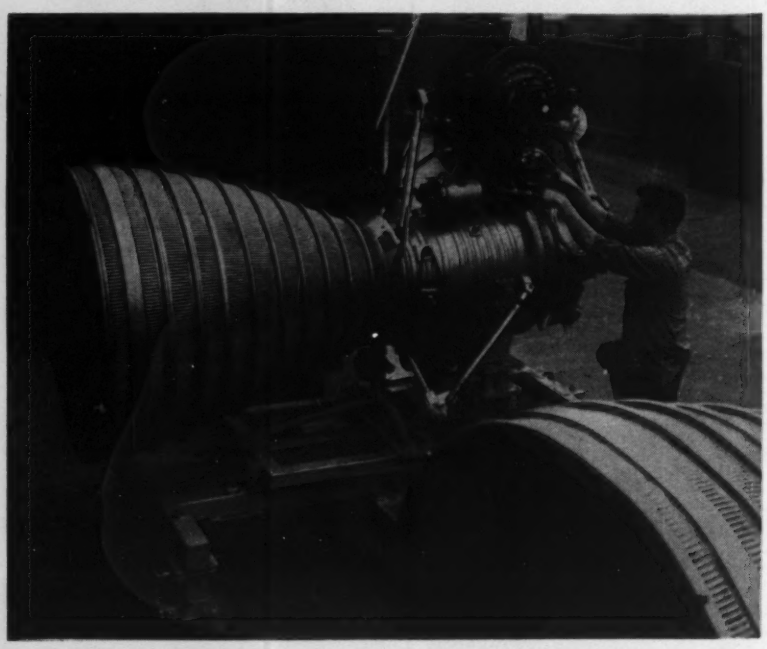
P. A. Predictions — What does the balance of 1960 hold in store for the nation's business? Chester F. Ogden, chairman, NAPA Business Survey Committee and vice-president, Detroit Edison Co., reported on his latest poll:

"Our members don't look for any serious slump. Some 47 pct believe the second half of 1960 will be better than the first half. Some 39 pct see no change, and only 14 pct think it will be worse," Mr. Ogden says.

The country's buyers say that they don't look for a boom, but rather a modest and gradual improvement.

Caution is the watchword. Purchasing executives say they'll keep their inventories in check, shorten forward buying time. And most important, they'll keep their buying policies flexible.

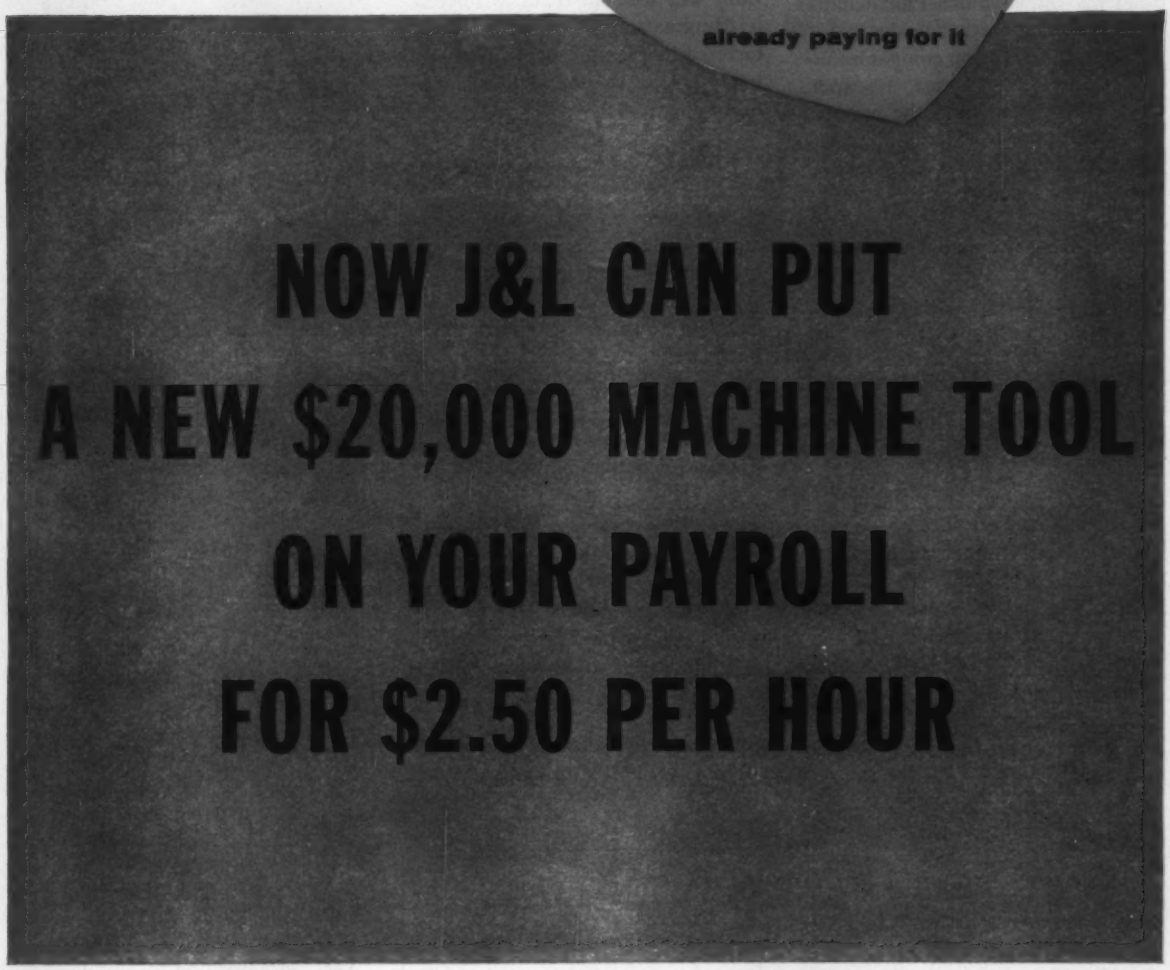
Supplying Power to Lift the Saturn



FAST DEVELOPMENT: Only eight months after getting contract, Rocketdyne, division of North American Aviation, delivered first H-1 engine to Army Ballistic Missile Agency. Engines will be used in clusters of eight to provide 1.5 million lb thrust of the Saturn missile booster.

JONES & LAMSON MACHINE COMPANY

the man who needs a new machine tool is already paying for it



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INDUSTRIAL BRIEFS

Philadelphia Sites — Plans are slated for a $5 million engineering industrial park on U. S. Highway 130 for the Camden-Philadelphia area. The engineering center is for industrial engineering companies involved in sales, service, research, and development, and the services they will require. Herman Schaevitz, the developer, is president of Schaevitz Engineering.

Back East—Wyman-Gordon Co. will transfer its Prex Precision facilities and production from Franklin Park, Ill., to its Eastern Div. plants in Worcester, Mass. The move is designed to accelerate expansion of its Eastern Div. forging program in missiles, rockets and aircraft.

Order New Letterheads—A new symbol, NASMI, has replaced the initials NAWD. The 47-year old National Assn. of Waste Material Dealers is now known as the National Assn. of Secondary Material Industries, effective June 1. The association has more than 500 member firms all over the U. S., Canada and abroad.

Rare Earth Prices — The Research Chemicals Div., Nuclear Corp. of America has established a revised price list for its rare earth metals. It has been put into effect on 12 different rare earth metals, including Yttrium, Cerium, Holmium and Erbium. A price list can be obtained from the Corporation at 170 West Providencia, Burbank, Calif.

New Fields—Progress Mfg. Co., Inc., plans to acquire General Offset Printing Co., a Massachusetts printing concern, as well as two smaller printing companies. It has also initiated steps leading to a merger with Reading Tube Corp., manufacturer of copper and brass tubing. Proposed acquisitions and merger would put Progress sales above $50 million annually.

Numerical System—Hughes Aircraft's Industrial Systems Div. has a $120,000 sales contract for numerical machine tool control units. They will be delivered to the Burg Tool Mfg. Co., Gardena, Calif. Burg will use the units to operate its Burgmaster six or eight spindle turret drill presses and will market both units as a complete machine tool system.

More Western Movement—Veeder-Root Inc., manufacturers of computers and counting instruments, is expanding its West Coast operations to include manufacturing and sales and service. A plant has been established at Park Place, Glendale, Calif. It will be known as Veeder-Root Western.

On Deck — The Navy has awarded National Research Corp. a $73,343 contract to develop super-fine high-melting metal powders. Metals such as tantalum, molybdenum and niobium are now under investigation by scientists at NRC. The study on these refractory metals is being conducted for the Bureau of Naval Weapons.

Expanding Plastics — Samuel Moore & Co., extruders of plastic products, is expanding its plant by 70 pct — the sixth since 1947 when the company moved to its present location at Mantua, O. Construction has begun and will be completed late this summer.

"Don't you think you're asking too much by saying 'let's be fair about the matter,' Buxton?"

Oklahoma Outlet—Leschen Wire Rope Div., H. K. Porter Co., Inc., has opened a district office and warehouse in Oklahoma City, Okla. The new facility is located at 216 S. Klein St. and will serve as headquarters for the midwest sales district.

More Capacity in Detroit—One of the latest oxygen converters built by Pennsylvania Engineering Corp., has gone into production at McLouth Steel Corp. This new 110-ton capacity unit supplements production of five other oxygen converters at McLouth—two of 110 tons capacity and three of 60 tons capacity.

Work for New England — The Swartwout Div. of Crane Co. has moved its production facilities and headquarters from Cleveland to Hooksett, N. H. Swartwout is maintaining a Cleveland sales office at 21877 Euclid Ave. The new Swartwout plant has been in production since March 21.

Sold—American Metal Climax, Inc., has acquired Pyron Corp., Niagara Falls, N. Y. This places AMC in a position to produce both ferrous and nonferrous metal powders. Plans call for a new plant in the Niagara Falls area. Pyron will be part of the company's AMCO Div., which has produced nonferrous metal powders for over thirty years.

Final Stages — Construction of the new plant of United States Drill Head Co., Cincinnati, is under way at the 14-acre site at 5298 River Rd. The facility is expected to be occupied by September 1. It will mark completion of the $75,000 building program begun by the company in 1957.

JONES & LAMSON "AUTOMATION"

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Major savings on every job during first full year of tape control operation

At The Goss Company, a division of Miehle-Goss-Dexter, Inc., Chicago, tape control machining plays an important part in the over-all production operation.

For instance, this J & L tape-controlled positioning table, equipped with a standard column drill press, has achieved an average of 30 to 40% savings in floor-to-floor time on every job assigned. One job, involving drilling and reaming of small malleable iron transfer roll adjusting plates, was transferred from a conventional sensitive drill press setup to the J & L machine. Job lots consisted of only four pieces.

The old setup required 3.1 hours production time for each lot. Using tape control, with a simple locating and clamping setup, Goss has been able to cut this time to 1.7 hours—a saving of 1.4 hours per lot, or more than 45%. Hole location is more accurate too, because J & L tape control consistently holds tolerances of + or — .001". With the old setup, it was difficult to hold hole locations to less than .010" on layout jobs of this size.

Investigate how *production-proven* tape control units can help increase the efficiency of *your* operation. Write to Jones & Lamson Machine Company, 511 Clinton Street, Springfield, Vermont for folder 5902, "Tape Control Positioning".

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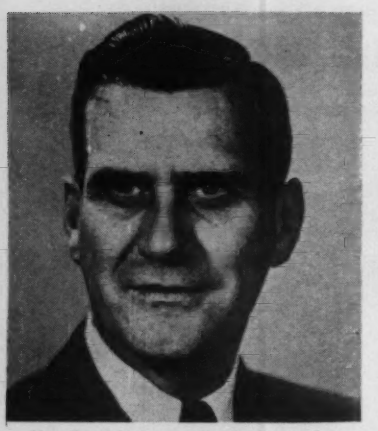


R. J. Linney, elected president and a director, Reserve Mining Co.

The Anaconda Co.—**C. J. Parkinson,** elected executive vice president and general counsel.

The Holo-Krome Screw Corp.—**H. A. Neff,** elected vice president and general manager.

Amplex Div., Chrysler Corp.—**W. P. Balthrop,** appointed president.

United States Manganese Corp.—**A. M. Garbade,** elected president.

Diamond Electronics, Div. of Diamond Power Specialty Corp.—**J. G. Gelder,** appointed general manager.

The Wilkinson Co. — **W. L. Kuethe,** named president.

Daystrom Inc., Weston Instruments Div.—**D. R. MacNaughton,** named product sales manager, non-contact gauges.

Electrical Conductor Div., Kaiser Aluminum & Chemical Sales, Inc.—**C. R. Pickens,** named insulated products sales manager.

Sunbeam Equipment Corp. — **Willard Roth,** appointed asst. chief engineer, industrial furnaces and equipment.

Hamilton Foundry Inc. — **G. T. Cahill,** named administrative assistant.

Caine Steel Co.—**A. L. Irish, Jr.,** appointed manager, stainless steel sales.

Pacific Extrusions, Inc.—**Vincent Young,** appointed sales manager.

Hershey Metal Products—**W. R. Knowles,** appointed sales manager.

Consolidated Electrodynamics Corp.—**P. B. Russ, Jr.,** appointed manager, systems and procedures.

Inland Steel Container Co.—**J. F. Dye,** appointed plant manager, Cleveland.

Electronics and Instrumentation Div., Baldwin-Lima-Hamilton Corp.—**H. E. Lockery,** appointed manager, engineering.

C. W. Lockhart, appointed vice president, sales, Buffalo Forge Co.

The Lapointe Machine Tool Co.—**F. J. Kenney,** appointed sales manager.

Clyde Iron Works, Inc.—**H. T. Bratt,** appointed chief engineer.

The Kempsmith Machine Co.—**Harry Mussun,** appointed director, machine tool sales.

K-G Equipment Co., a Div. of Air Products, Inc.—**S. E. Fey,** appointed general manager.

York Div., Borg-Warner Corp.—**J. B. Elliott,** named president and general manager.

Indar Corp.—**J. R. Roberts, Jr.,** named president.

The American Brass Co.—**E. M. Bleser,** elected to the board of di-

(Continued on P. 92)

S. S. Jackson, appointed vice president, administration, Kennecott Copper Corp.

W. E. Gregg, elected vice president, technology, Crucible Steel Co. of America.

E. F. Shelley, appointed a group officer and vice president, U. S. Industries, Inc.

JONES & LAMSON MACHINE TOOLS

the man who needs a new machine tool is already paying for it

Two-dimension tracing eliminates secondary operations and reduces costly "off" machine time

Two-dimension tracing, combined with conventional turret lathe tooling, provides an extremely versatile method for complete machining to tight specifications.

For instance, the end use of the connecting rod bolt (illustrated above) demands extremely fine finish to eliminate the starting of fatigue cracks. In addition, relief surfaces, O.D., head faces, and threaded end must all be square and concentric. Radii of fillets connecting the different diameters must be smooth and free from scratches. Two reliefs, each 6½″ in length, must be held to + or — .002″ and to 40-50 RMS to eliminate subsequent grinding operations. The finished parts are 19-3/4″ long with different O.D.'s varying from 1-1/2″ to 2-7/16″. The material is tough: AISI 4140; Brinell 241.

All this is accomplished in one tooling set-up on a J&L turret lathe with a two-dimensional tracer. Floor-to-floor time for finished parts is less than three minutes on the head end, and less than nine minutes on the shank end. Write for Folder #5903.

Jones & Lamson Machine Company, 511 Clinton Street, Springfield, Vermont.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools

(Continued from P. 90)

rectors; **Justice Lockwood,** named vice president; **A. W. Rockwell,** appointed vice president, sales; **C. E. Woodward,** appointed asst. to the president.

K. W. Wiedt, Jr., named general superintendent, mills and finishing, Universal-Cyclops Steel Corp.

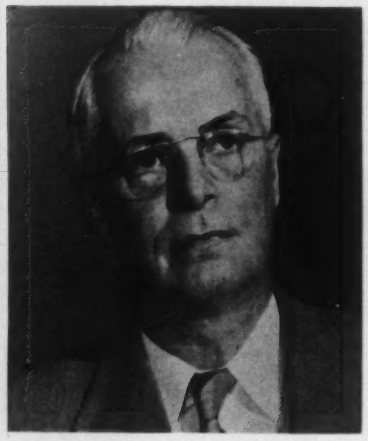
Clark Equiment Co.—**H. D. Nelson** and **B. E. Phillips,** elected vice presidents.

Acme Steel Co.—**Frank Weston,** appointed chief industrial engineer, Riverdale, Ill., plant.

Rockwell Mfg. Co. — **S. W. Brown,** named general manager, Uniontown, Pa., plant.

Kaiser Steel Corp.—**D. B. Kitchel,** appointed asst. general purchasing agent.

A. T. Shack, appointed manager, plant administration, Bridgeville plant, Universal-Cyclops Steel Corp.



L. E. Wells, promoted to vice president, engineering, Exide Industrial Div., The Electric Storage Battery Co., Philadelphia.

Universal Atlas Cement Div., U. S. Steel Corp.—**N. C. Ludwig,** appointed manager, manufacturing research, Raw Materials and Manufacturing Div., Buffington (Gary), Ind., headquarters; **W. V. Friedlaender,** named manager, products development and quality analyst, Quality and Technical Services Div., New York City.

Globe Steel Abrasive Co.—**D. J. Pezdirtz,** namer chief metallurgist and manager, metal abrasive quality control.

Brubaker Tool Corp., Morton Machine Works Div.—**A. W. Tilder,** appointed general manager.

R. T. Ferguson, appointed technical manager, pig and ingot sales, Aluminum Co. of America.

K. B. MacNaughton, appointed general sales manager, rolling mill products, The Steel Co. of Canada Ltd.

Keuffel & Esser Co.—**J. R. Juten, William Keller** and **Eugene Koenig,** appointed vice presidents; **D. L. Crandell,** appointed Chicago sales manager; **Belo Braunecker,** appointed office manager in Chicago.

International Div., Hewitt-Robins Inc.—**E. A. Hoppenstedt,** appointed sales manager.

Bristol Brass Corp.—**C. C. Merrow,** appointed a sales representative.

Taylor Fibre Co.—**J. L. Delaney** and **M. B. Rizzo,** appointed sales engineers.

The Bristol Co.—**R. M. Gabey,** appointed export manager.

F. C. Irving, Jr., appointed technical manager, casting sales, Aluminum Co. of America.

JONES & LAMSON OPTICAL COMPARATORS

the man who needs a new machine tool is already paying for it

Now... an Economy-size Optical Comparator with "Big Machine" Features

Here is a fine optical inspection and measuring instrument of brand-new design. It is the first small-screen comparator to offer such BIG performance. It is equally suitable for production-line operation or job-shop work, and is extremely flexible in application.

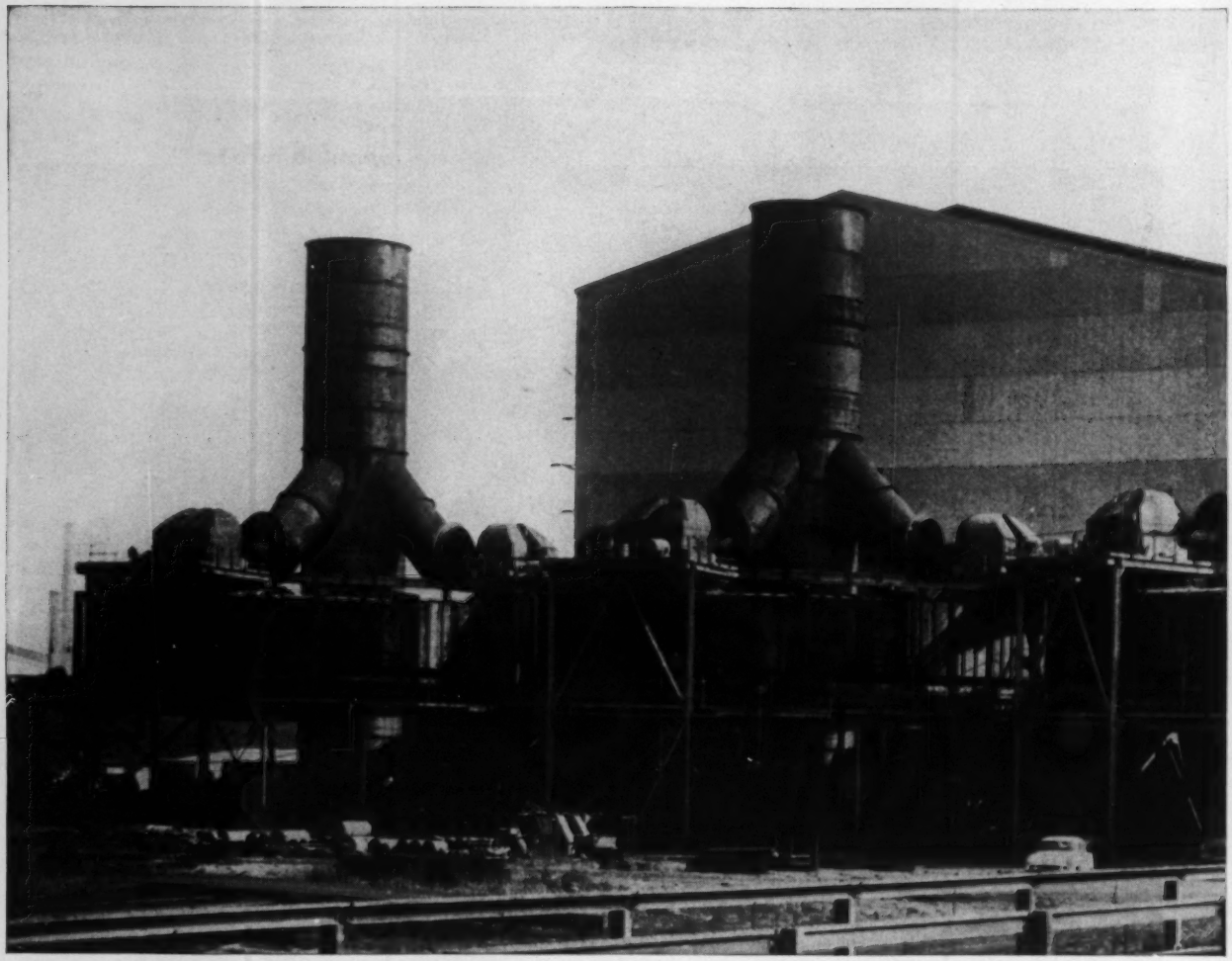
The J & L TC-10 is of precision machine tool construction. This provides a solid base for precise inspection and measurement.

Three different table styles are available, including a fixed table for straight comparison work, a plain table, and a measuring table which gives you 6 square inches of measuring area. All measurements are read directly to .0001", without computation.

Among other things, the TC-10 is adaptable for *reflection inspection*. Reflected images are extremely sharp—even at high magnifications.

Other "big machine" features include Angle Measuring; Quick-Change Lens Mount; Vertical Staging; Tracing Inspection. And there's a big bonus in the 5X, 2" aperture lens, which gives inspection capacity and accuracy hitherto unattainable on a machine of this size. Write for folder. Jones & Lamson Machine Company, 511 Clinton St., Springfield, Vt.

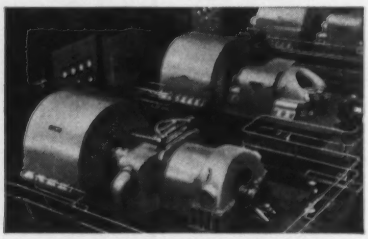
Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools



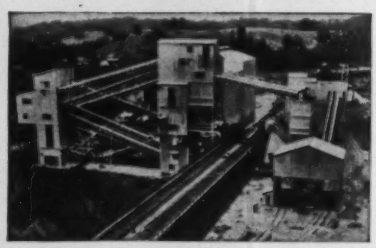
One of two 15,000 ton per day Dravo-Lurgi sinter plants. Each plant contains three sinter machines, and is rated among the largest in the world.

Dravo-Lurgi sinter plant, ore bridges, dock, boiler plant, pump house and waste treatment facilities are included in engineering-construction for this mid-west steel mill.

Dravo-built power plant produces electric power and high pressure steam for mill supply. Contract included piping steam and blast furnace gas to and from the plant.

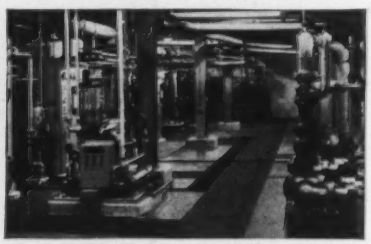


Part of a Dravo power plant project, these three DeLaval turbo-blowers produce 290,000 cfm of standard air for a major steel company's blast furnaces.

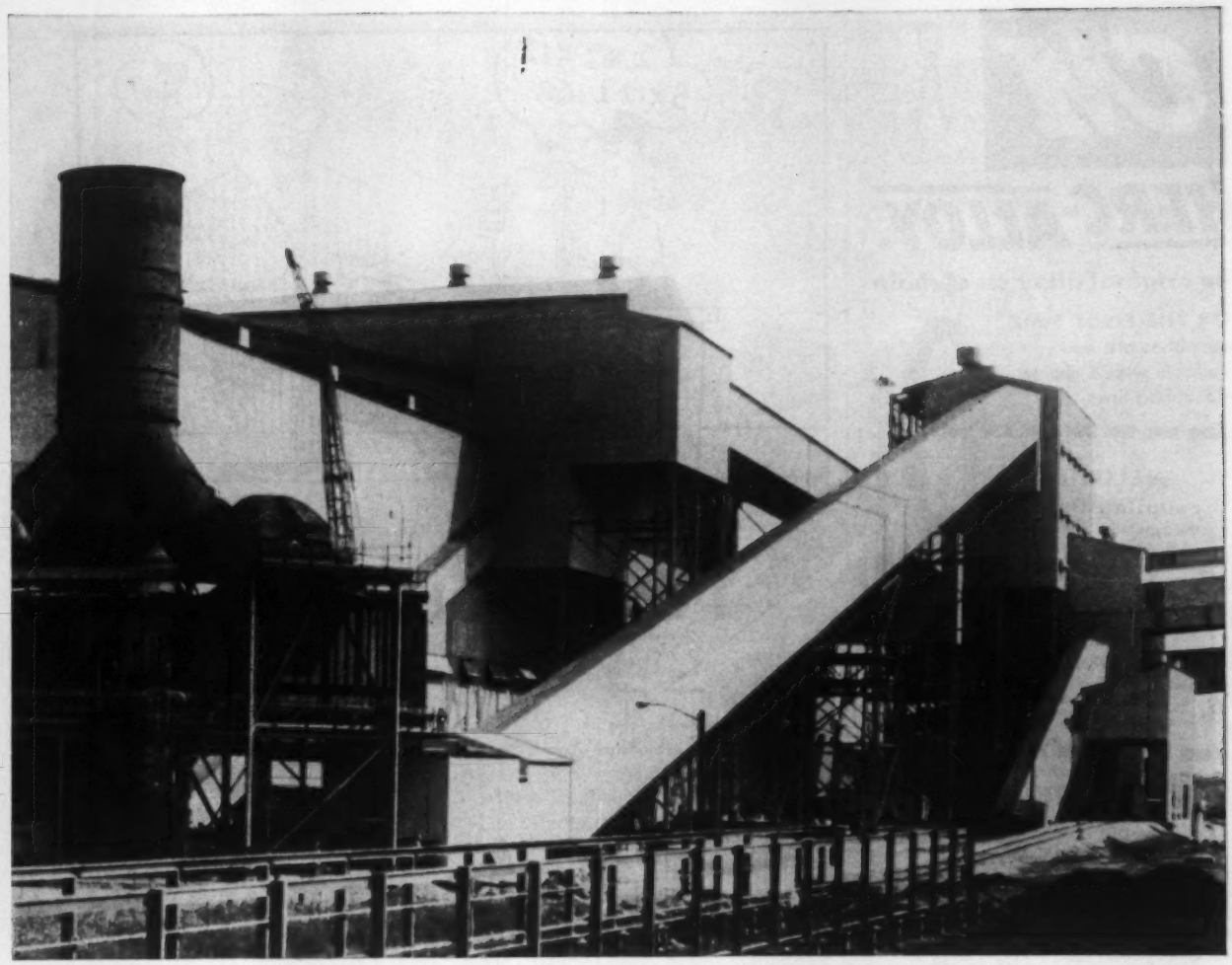


A 2400 ton per day Dravo-Lurgi sinter plant constructed by Dravo. Materials handling system is designed to receive and store a day's supply of raw materials in eight hours.

Blast furnace flue dust recovery plant includes two 105-foot Walker Process Thickeners. Other Dravo projects include pumping stations, water treatment and waste disposal plants.



Automatic Dravo-DeLaval mill lubrication system, circulating a total of 45,200 gallons of oil at 556 gpm, protects one of the world's fastest 10-inch rod mills.



Turn-key Construction for the Steel Industry

sinter plants • power plants • materials handling • mill lubrication
water clarifying and pumping stations • harbor facilities • piping

Dravo's ability to handle turn-key projects is the result of wide engineering-construction experience together with an intimate understanding of steel industry problems. Working to your operating requirements, Dravo assumes overall responsibility for engineering, procurement of equipment and erection of the complete facility.

With this type of single responsibility contract, customer's executive time is conserved, and, since engineering and construction are integrated, the project "gets done" on time.

Your next expansion or replacement project can benefit in terms of final cost and time saved from the type of teamwork that Dravo experience makes possible.

For more information, write or phone DRAVO CORPORATION, Pittsburgh 22, Pennsylvania.

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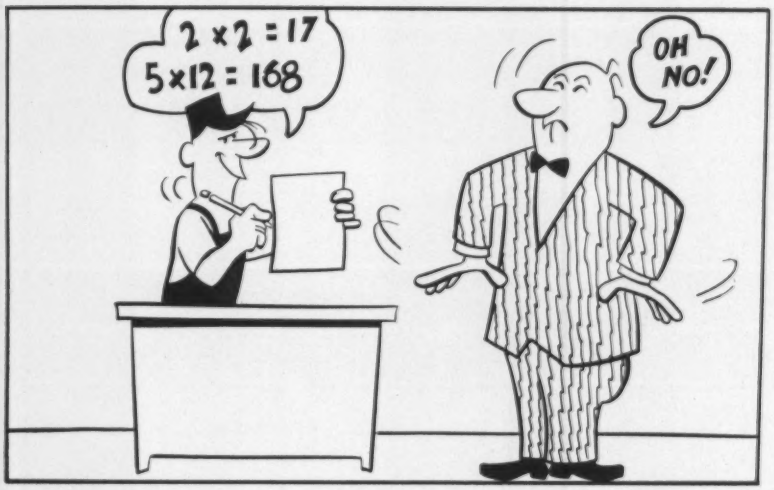


You Arbitrate It!

1/8 ≠0.120

From the files of
The American Arbitration Association

■ For a number of years, a power-shovel manufacturing company had operated an apprentice program. The course of instruction included practical shop experience as well as academic work. The apprentice agreement gave management the clear right to dismiss from the program any who weren't making the grade in either respect.

One such apprentice was Floyd G., a young fellow without any previous experience with the company. When management found out that he couldn't qualify in basic shop math, he was discharged.

"You Arbitrate It!" appears in the second issue of The IRON AGE each month. Look for it in the July 14 issue.

Dismissal Pending—At this the union filed a grievance. "You can dismiss Floyd from the apprentice program if you want to," argued the international representative, "but he remains an employee just the same. You've got to transfer him to another job he can handle in accordance with his seniority."

"That's the way it would be if Floyd had had experience on another job in the plant," answered the industrial relations director. "Our apprenticeship agreement doesn't provide for retaining apprentices who have no prior experience or job to fall back on."

Finally, the case went to arbitration under the rules of the American Arbitration Association. How would you rule?

The Arbitrator Ruled:

Reading the whole apprentice agreement and the collective bargaining contract, the arbitrator drew these conclusions: (1) Apprentices may acquire plant-wide seniority during their apprenticeship and thereby become regularly constituted employees; (2) Apprentices do not acquire departmental seniority until after they complete the program and become assigned to a department; and (3) Apprentices may therefore not displace a regular production worker. In view of this, the arbitrator said Floyd could not be discharged. He would have to be held in a lay-off status until such time as there was work available that he could do.

CAUTION: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.

in 1960...

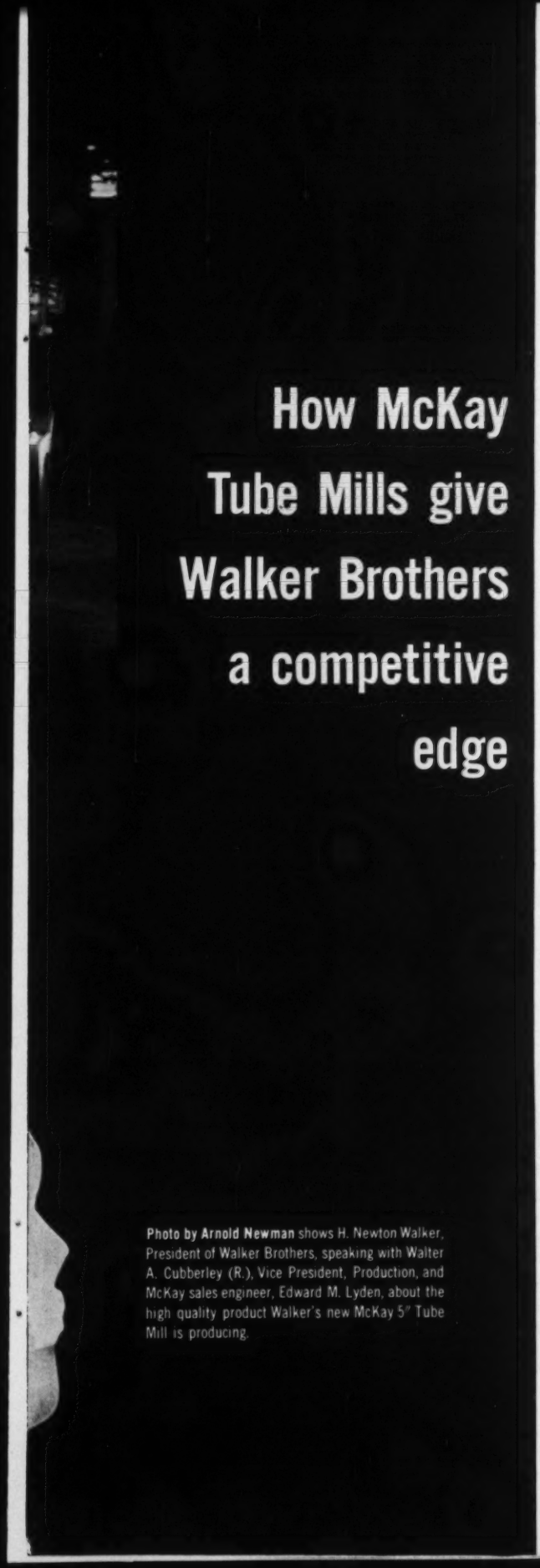
LOOK TO

McKAY MACHINE

FOR PROGRESS IN METAL PROCESSING

FOR EXAMPLE—McKay Pipe and Tube Mills are recognized to be the best conceived and finest constructed machines of their kind. On the next two pages H. Newton Walker, President of Walker Brothers, Conshohocken, Pa., gives a typical user reaction.

MKAY



How McKay Tube Mills give Walker Brothers a competitive edge

Photo by Arnold Newman shows H. Newton Walker, President of Walker Brothers, speaking with Walter A. Cubberley (R.), Vice President, Production, and McKay sales engineer, Edward M. Lyden, about the high quality product Walker's new McKay 5" Tube Mill is producing.

"Our new McKay 5" Tube Mill enables us to extend our production range to the larger sizes of Walkerduct and steel tubing. The mill affords close manufacturing tolerances and improved control over production schedules," says H. Newton Walker, President of Walker Brothers, Conshohocken, Pa.

High Quality Product—Walker Brothers has been a primary supplier of high quality electrical distribution materials to the commercial and industrial construction industry for fifty years. "Walker of Conshohocken" products include building wire, power and control cables, mechanical steel tubing, steel electrical metallic tubing, rigid steel conduit and underfloor raceways.

"This is the third McKay Tube Mill we have installed since 1951 to increase our capacity to manufacture conduit and raceways," continues Mr. Walker. "Each of these mills," he says, "has turned out a product consistent with our high standards of manufacture."

Better Production Economies—Walker Brothers has, in addition to the new McKay 5" Tube Mill, two 3"-capacity McKay mills equipped with strip looping and welding equipment. These mills are generally used to produce ½" through 2" thin wall conduit on a continuous basis at a speed of 150 feet per minute. The new 5" mill also operates at 150 F.P.M. and at that speed can easily produce Walker's line of 6.5" x 1.5" x .076" rectangular raceway.

Mr. Walter Cubberley, Vice President, Production, states: "We have been most satisfied with the performance of this equipment. Performance of the McKay mill has more than met our expectations regarding versatility and cost savings."

Low Maintenance Cost—"There's something to be said for the design of this equipment, too," he says, "in that maintenance is, and has been, satisfactorily low regardless of the age of the machinery."

"This is very solid equipment, including the welder. In fact, I would say these are the best mills we could have selected for our type of operation," Mr. Cubberley concludes.

McKay Machine designs and builds electricweld tube mills for high speed production of ferrous and nonferrous welded tubing up to 20" in diameter. The experience of nearly 25 years of pioneering in the design of tube making equipment is behind each modern McKay Tube Mill.

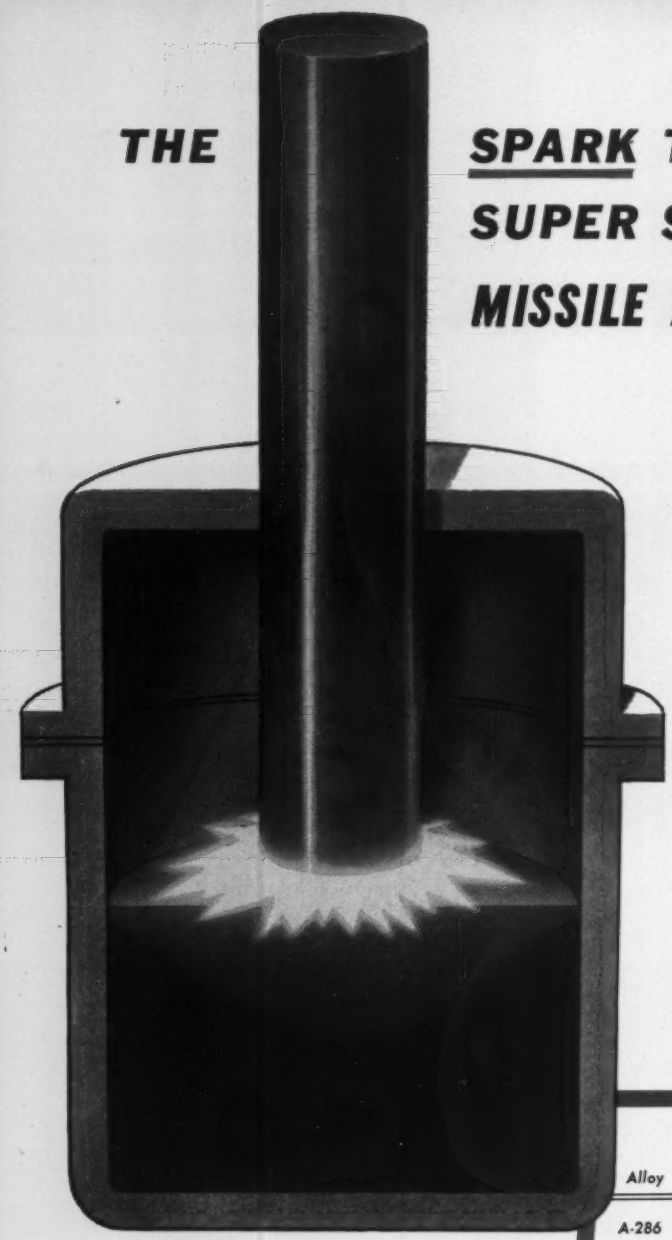
Write for literature, or send a description of your needs for prompt quotation to McKay Machine Company, Youngstown 1, Ohio.

LOOK TO

McKAY MCK MACHINE

FOR PROGRESS IN METAL PROCESSING

THE SPARK THAT MAKES SUPER STEELS FOR MISSILE AGE SPECIFICATIONS



Fine electric furnace steel electrodes are remelted vertically in a water cooled copper ingot mold under a vacuum of 5 to 50 microns. The result? Midvac Steels to meet the most critical design applications of today's missile and aircraft requirements. Steels made by a process that makes super alloys even better. Insures increased tensile and impact properties, improved stress rupture strength at elevated temperatures and longer fatigue life.

With the Midvac Process of consumable electrode vacuum melting standard commercial alloys can also be made with increased cleanliness resulting in higher properties than have been available under conventional means.

Midvac Steels are offered in many super alloys (some are shown in the table below) in ingots, billets or forgings for the production of missile combustion chambers, tail cone assemblies, turbine components, air craft landing gear parts and other products requiring properties beyond the capabilities of conventional steels.

Alloy	Melting Process	Yield Strength .2	Ultimate Tensile Strength	Percent Elongation	Percent Reduction of Area
A-286	Air Melt	99,000 psi.	132,300 psi.	9.0%	14.7%
	Midvac	117,000 psi.	150,500 psi.	21.3%	33.8%
Gannalloy	Air Melt	112,000	159,900	13.0%	21.0%
	Midvac	142,600	177,250	18.0%	31.6%
D6A-C	Air Melt	234,800	281,000	4.9%	20.6%
	Midvac	256,700	294,250	9.6%	28.4%
Tricent	Air Melt	238,600	284,500	6.1%	19.7%
	Midvac	254,300	291,600	10.3%	25.6%

Properties shown are averages of 25 heats

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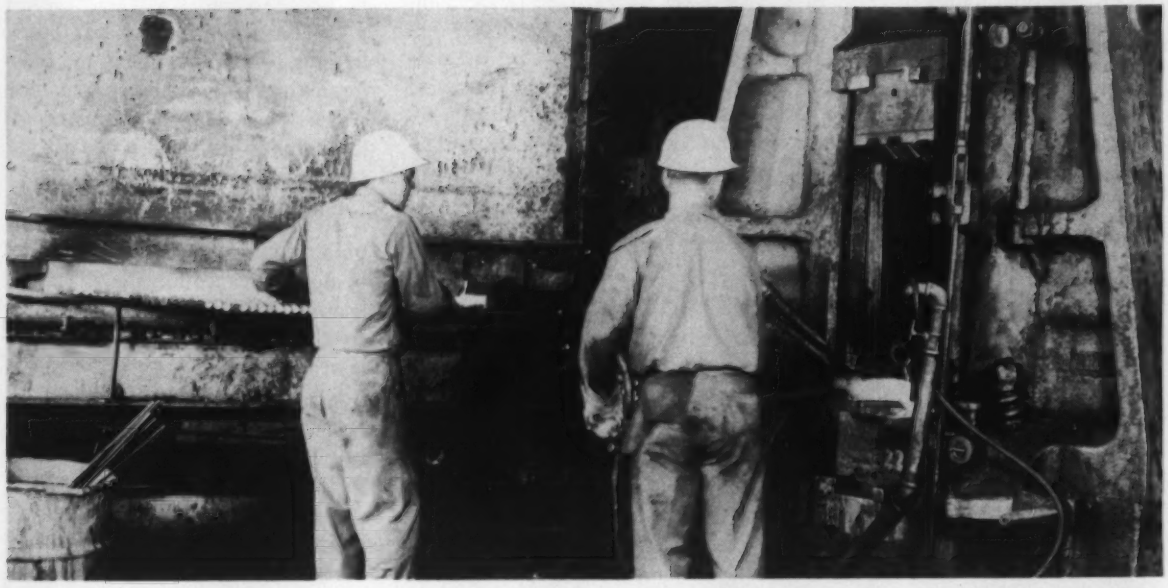
Midvac Steels



FOR FORGING ONLY: Modern methods help small shop produce Pitman arms in a 2000-lb drop hammer.

Can the Small Forger Compete With Big Automated Shops?

By D. Clark and G. Ruicci—Webb Forging Co., Belleville, Mich.

The small drop forging shop must face facts. It can't afford all new equipment.

But it can still get top efficiency by using modern techniques and design.

■ Can the small drop forging shop compete with an automated press line? Should it replace any or all present equipment? Is the shop making efficient use of what it now has? These are some of the problems that confront many small forging plants who market closed die parts.

One such shop, Webb Forging Co., Belleville, Mich., looked into these problems thoroughly. Results of its study are encouraging to the little man in industry. Small companies can compete with the mass producers.

But don't try to copy mass producers with automated equipment. This is not the answer. The wise approach lies in making use of present facilities and methods and in bringing them up to maximum capacity.

Savings Involved—A big gain for the small shop is indicated in the table. It's in longer die life. Assume that the cost of forging dies for a sample part is the same for both companies—large and small.

Webb Forging, with proper die design and maintenance in a drop board hammer, gets 100,000 die life regularly, compared to 25,000 pieces on an automated line.

Low Maintenance—Actually, the table covers typical forgings. They're made either by conventional drop-hammer operations, or processed on an automated press line. The first two columns represent high-production operations in a captive forge shop.

As a result, the cost of maintaining dies in a drop board hammer is one-fourth that of maintaining dies in an automated line. Also, automatic forging lines require added tooling, too.

Other Advantages — The study also pointed out that a greater out-

lay of capital was required to install an automated press line. In fact, it was four times the cost of installing a drop board hammer.

With drop forgings, the end user can get a hidden extra. Little added cost is needed. In forged arms, holes must be put in the bosses at each end. They must also be parallel, even though they're in different planes. By receiving the forging with holes punched out, the customer reduces his machining costs.

In the hammer operation, both the large and small holes in these two bosses are plugged in the hammer die. The remaining steel between the bottom of the plugs is about 0.125 in. thick. This same steel is removed "free of charge" in the coining operation by a combination coin-punch die.

Little Machining — Coin tolerances on boss thicknesses are 0.015 in. plus or minus. From centerline to centerline, they are 0.030 in. plus or minus. Tolerances of the punched hole to outside of bosses is 0.030-in. total indicator reading.

Only machining stock of 0.060 in. plus 10° draft is left in the hole for clean-up. Tolerances from one plane of one boss to the plane of the other is also held to 0.030 in. plus or minus.

Heating Is Vital — One of the basic problems in the manufacture of close tolerance forgings is proper heating facilities. Yet, even the small shop can cope with this problem successfully.

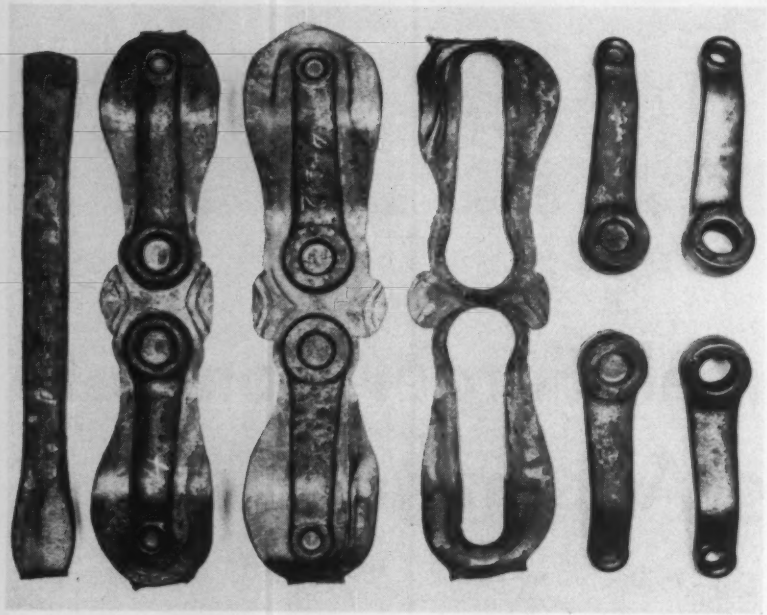
Adequate heating facilities mean burners and furnaces which heat the metal thoroughly, quickly and uniformly. Naturally, such sources will prevent the formation of scale. You must know when the billets reach forging temperature. Then it's vital to remove them quickly.

To control these factors, Webb Forging has its own patented "Cote Burner." And the company has also built special furnaces suited for billet heating. These burners atomize the oil by mixing it with the air. This feature combines with furnace design to impart a neutral atmosphere to the furnace.

Die Design — Forging dies are designed in such a manner that all the metal is moved under every blow of the hammer. This technique breaks up the scale and blows it out of the dies during the edging and blocking operations. Width of the forgings in the platter is smaller (but the thickness larger) than the finished part in the semi-finishing operation.

In the finishing impression, all metal moves slightly. Then the forging is brought down to size, filling the small radii in one or two blows of the hammer. The hammer blows knead the metal, thereby generating heat. This heat generation permits you to take advantage of a lower starting temperature.

Constant Parting Line — Unless the radius at the parting line is held, the width of the forging will grow rapidly. This uncontrolled growth will decrease trim die life,



FROM START TO FINISH: The progressive operations needed to produce two Pitman arms can only be obtained if the forging techniques are efficient and up-to-date. The result is a product ready for end use.

Small Shop Gets Long Die Life

FORGED LINKAGE ARM (SAE 1036 STEEL)

	Previous Process	Automated Line	Job Shop
Die Life, pieces	30,000	25,000	100,000
Production, pieces per hour	210	555	550
Manpower	2	2	2

FORGED BALLED LEVER ARM (1340-A STEEL)

Die Life	30,000	25,000	100,000
Production	210	430	520
Manpower	2	2	2

increase cost and problems of machining.

The greatest die wear occurs on the striking surfaces of the die. Very little die wear occurs in the upper and lower cavities because the steel is kept moving and is generating heat, preventing scale from forming.

When only a controlled amount of hot metal is forced around the radii at the parting line very little abrasive action will take place. So, whenever the forging die wears, the parting line remains constant.

Scale Problems—Another major problem in the production of forgings has always been imbedded scale. This type of scale has a great deal to do with die wear. It demands larger forging tolerances. As such, more machining is required.

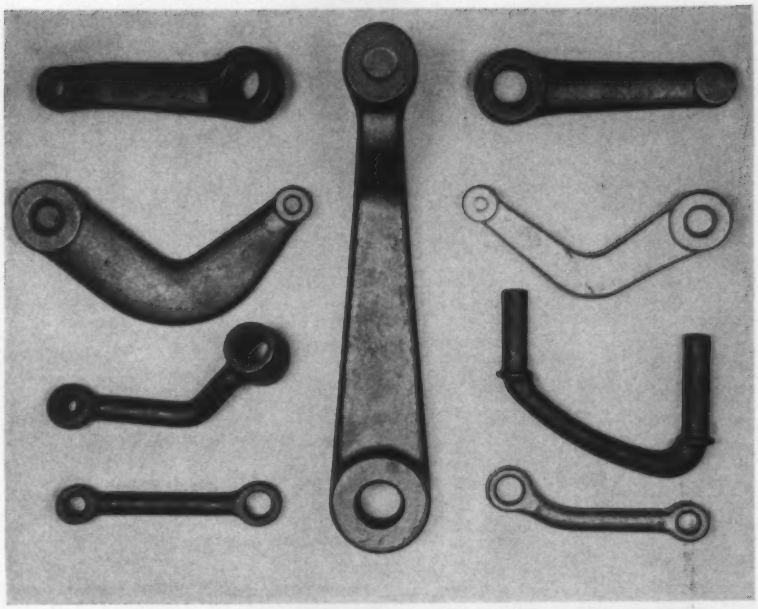
With the combination of proper heating, and good die design, you can virtually eliminate imbedded scale. The trick is to keep the metal moving under every blow of the hammer. The result will be a scale-free forging.

Some scale does form after the forging operation as the metal cools. But this scale is no problem. It can be peeled off quite easily.

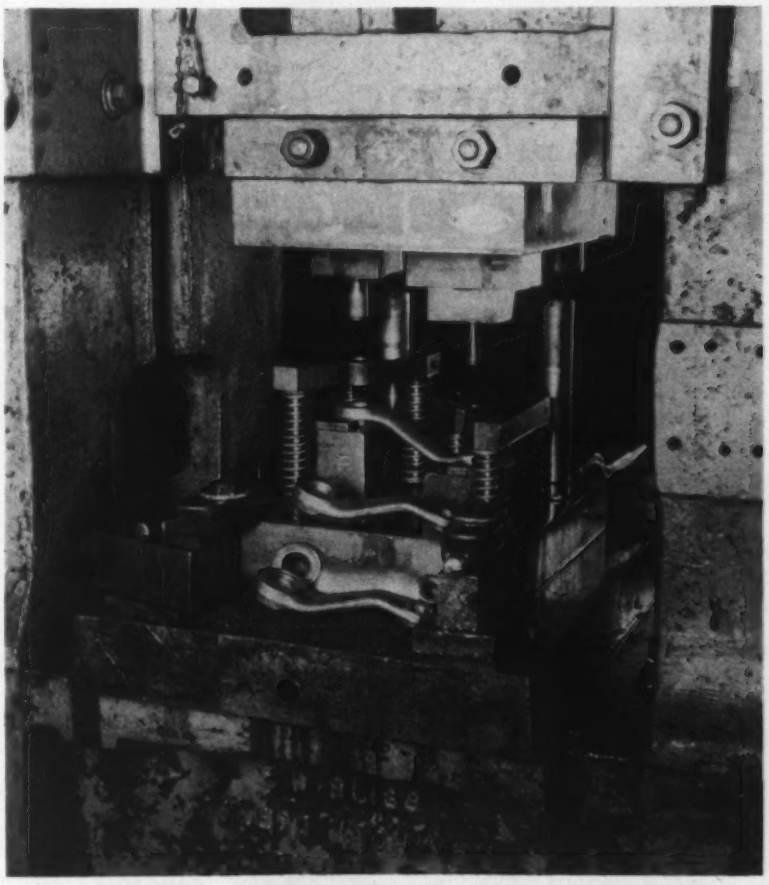
Hot or Cold?—You can argue about which trimming method should be used—hot or cold. When the practice reflects the forging operation itself, it boils down to a case of prevailing conditions. Is the part flat? Would it be difficult to locate in hot trimming?

It also helps to know whether the hot-trim press can keep pace with the forging operation. Cold trim gives higher production rates and lower direct labor costs. But extra handling is required. How do these factors compare with the lower output and higher direct labor costs in hot trimming?

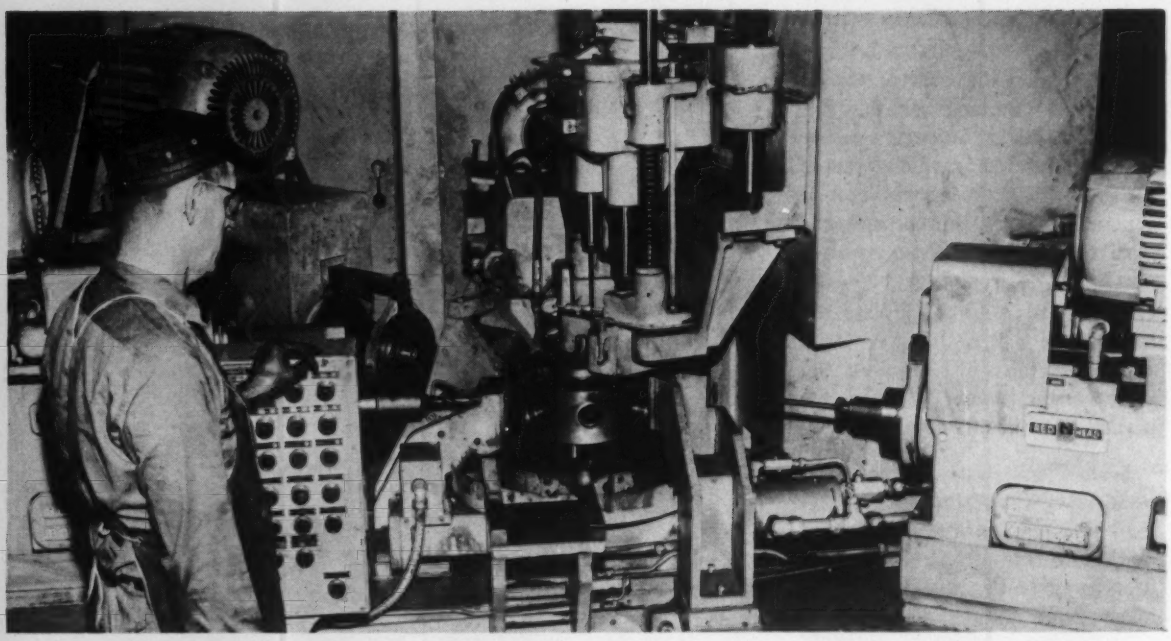
Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



JOBS FOR THE SMALL SHOP: The non-automated press line can produce a variety of fine quality Pitman and idler arms for industrial use.



TWO-STEP METHOD: By combining two steps in a 200-ton press, two holes can be produced in a single part. The steps are coining and piercing.



REDUCES TIME AND EFFORT—The six-station boring machines complete 170 operations in 46 minutes. The units will hold tolerances of +0.0000 in. to —0.0005 in., even on heavy stock removal operations.

New Boring Machine Setups Cut Process Time, Increase Output

Your equipment needs should be looked at before placing a job into shop production.

A small investment or proper setup could increase production and end machining errors.

▪ Two six-station boring machines are slicing 240 minutes off former production time in machining a cast-iron motor body. Formerly, three machines spent 286 minutes performing 170 operations on the 73 holes.

Starting from solid, the two Heald Bore-Matics drill, ream, bore, counterbore, groove and tap. Total cycle time is now only 46 minutes. Production is up 519 pct, from 0.21 to 1.3 parts per hour.

Each machine is equipped with six hydraulic-fed boring units—five mounted horizontally, the other vertically. An eight-station rotary is used to index and hold the work in position. After manual loading with a special counter-balanced loading device, all operations are automatic.

Proper Sequence—The first machine drills, bores, faces and reams in a 20-minute cycle. The sequence begins with the drilling of the first 1-in. diam hole for the cylinder bore.

At station two, core drilling enlarges this hole to 1¾-in. diam. Station one is driven with a timing belt rather than a vee to deliver maximum horsepower within a more compact space.

At station three, the hole is bored and counterbored. An outboard support at this station supports the spindle in its extended position. A ½-in. hole for radial location on the second machine is drilled at station four.

Station five is the vertical five-spindle drill head which drills four 11/32 and 13/32 in. holes from solid half-way through the part. A fifth hole ½ in. in diam is drilled completely through the part. The part is then placed in the second machine bottom side up.

In this second phase of the operation additional holes are drilled, tapped, and counterbored to preset depths. This second unit is equipped with a boringhead which carries a cross-fed unit for finishing off-center grooves.

Second Machine—The first three stations drill three ⅜-in. parallel

angular holes from solid. The holes link the cylinder bores.

The vertical five-spindle drill head is the fourth station. It completes the four holes drilled halfway through on the first machine and counterbores the fifth hole that was drilled through.

The fifth station is a slide unit with cross feed for grooving the cylinder bores. The last station taps the cylinder counterbores. All stations are interlocked for safety. Interference is prevented by a memory-switch circuit. It is possible for stations two and three to finish their operations at the same time.

To prevent interference the core drilling at station two is progressed until the next to last feed-in pass. It then waits at the center stop in the retracted position until station three has been completed, then feeds in to complete the core drilling.

The 10 indexes required to complete the eight cylinder bores on the first machine take 20 minutes.

Progressive Drilling—To keep the drilled holes clear of chips, the spindles, carrying drills, are set for progressive drilling.

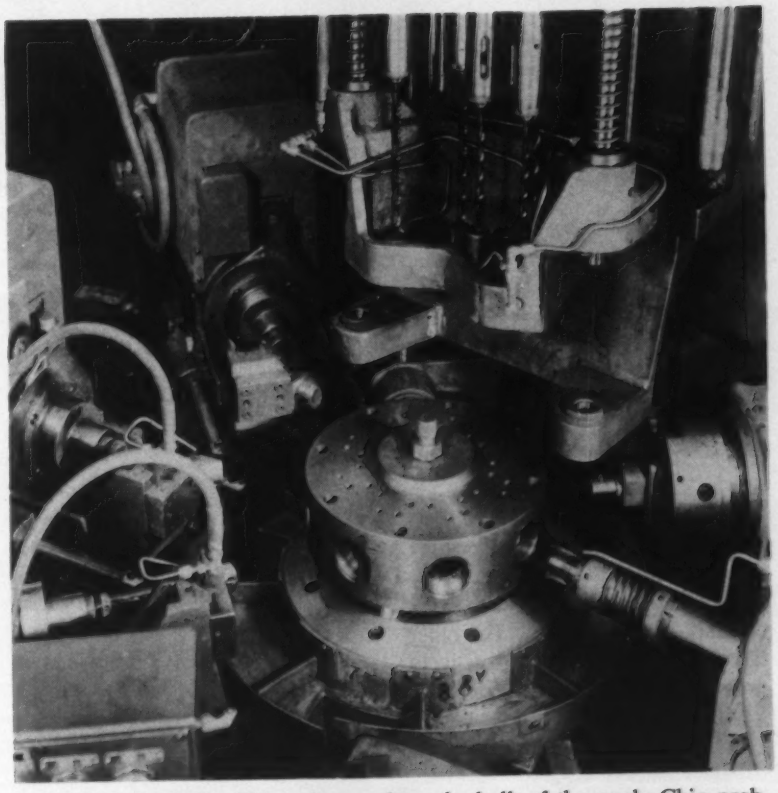
Equipped with a slip-joint and coupling, they provide compressed air through the spindle head and drills.

After drilling to a depth of about 1 in., the drill retracts to clear the chips. This cycle is repeated four to six times until the full depth is reached.

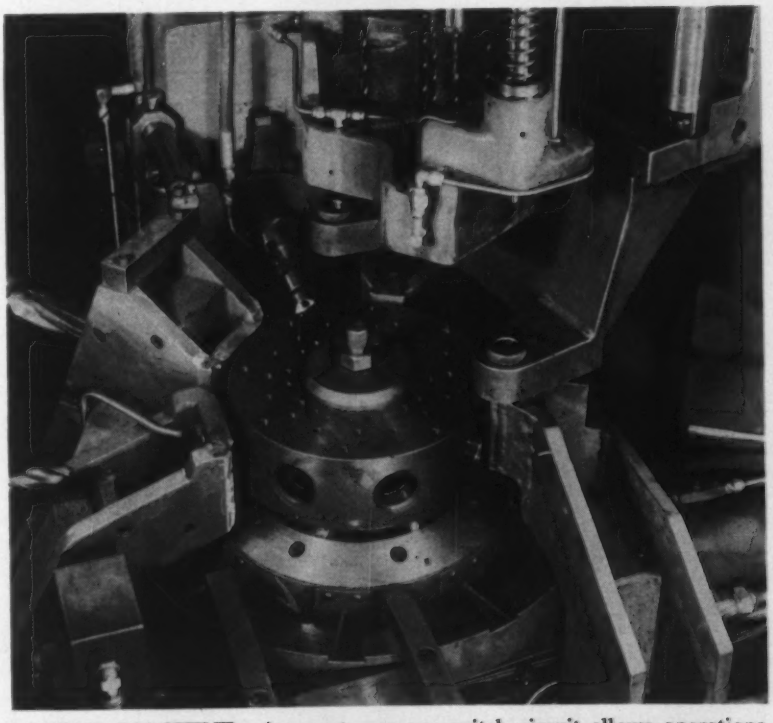
The Heald Machine Co., Worcester, has perfected the Bore-Matic units to maintain extreme accuracy. The large 1¾-in. cylinder bores are held to plus 0.0000-0 in., minus 0.0005 in.

Each machine has a lubrication system for oiling the fixtures, slides and bushing guides. Oil-mist lubrication is used on the vertical five-spindle drill heads.

To even out the demand for hydraulic oil a large accumulator is used. The accumulator adds an additional safety feature. It consists of a large volume valve which can dump oil rapidly. This will lower oil pressure when the power is shut off.



FIRST MACHINE—This unit completes the bulk of the work. Chip problems are avoided by using progressive drilling.



SECOND MACHINE—A preset memory switch circuit allows operations to complete themselves before advancing to the next station. All stations are interlocked for safety.

Synthetic Diaphragms Extend Furnace-Controller Life

Trouble-free operation in any heat-processing line depends upon two control factors.

These factors include: a fixed gas to air ratio and a controlled delivery pressure.

■ Two control factors prove vital in trouble-free operation of steel furnace lines. Both hinge on accurate maintenance.

One centers on the need for a constant gas to air ratio. The other factor revolves about fixed delivery pressure of the mixture—even under extreme changes in fuel demand.

A combustion controller, made by the Selas Corp. of America, Dresher, Pa., provides close-tolerance control for heat processing of metals, ceramics, glass, chemicals, petroleum, food, paper and other products.

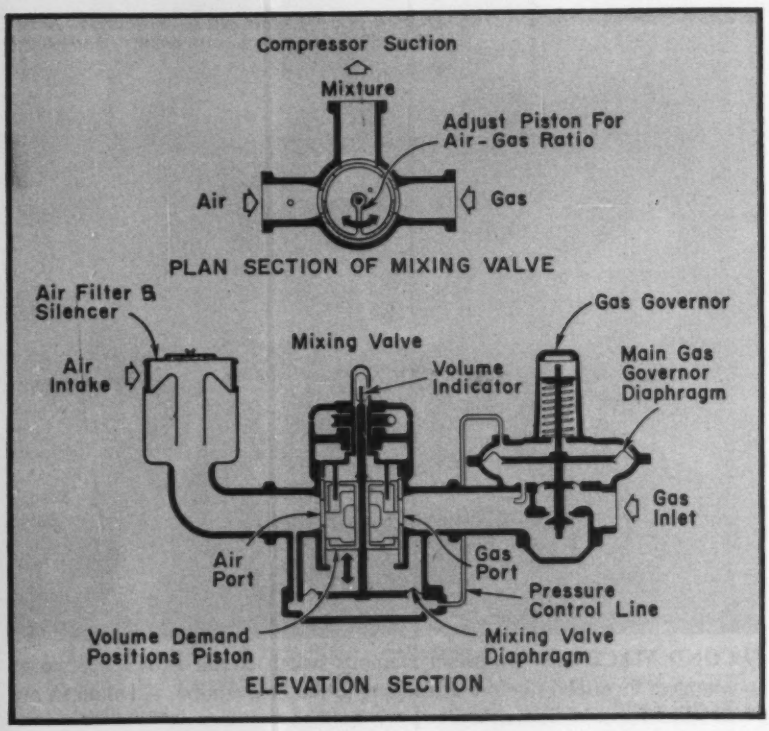
As a result of recent design changes by Selas, these controllers serve for extended periods of time —without repairs or replacements.

Switch Diaphragms — One vital factor in the improved service of the unit has been a change from leather to synthetic diaphragms. The new diaphragms serve in the unit's mixing valve and pressure governor.

Selas checked out several synthetics. They subjected them to severe tests. A number of them were placed in units which the company uses in its own plant. Some synthetic-coated fabrics were found superior to leather.

The preferred fabrics used today are Reevecote 7134 and 7028 in thicknesses of 0.010 and 0.020 in. These fabrics are made by the Vulcan Rubber Products Div., Reeves Brothers, Inc., New York.

Here's Key to Smooth Action



Wide Range—The Selas unit consists of four main parts. These include a gas regulator, a mixing valve, a compressor and pressure governor, and an electric motor. The units are made in rated capacities ranging from 500 to 150,000 cu ft.

When preset to a desired gas to air ratio, each unit maintains that ratio regardless of variations in mixture demand or in gas and air supply pressures.

Heart of the unit is the mixing-valve assembly. The mainstay of this assembly is a zero-type gas governor. It provides automatic equalization of air and gas inlet pressures. It also maintains a constant flow velocity through the air and gas ports.

How Does it Operate?—Suction from the compressor unit draws room air and line gas through the mixing valve. A pressure-balanced control system equalizes variations in the intake-air supply.

The same suction above the mixing valve diaphragm acts to lift the mixing valve piston. This in turn controls the size of the inlet ports for gas and air supply. Negative air-inlet pressure—resistance of piping, filter, etc.—plus the weight of the piston and other moving parts act to lower the piston.

Meets Demands—At any point in the volume range, the piston automatically raises or lowers so that the exposed port area allows the needed volume to pass.

Control is maintained while these forces are in balance. The gas and

air ports thereby maintain constant velocity.

A pressure-balance control line is located in the chamber above the gas-regulator diaphragm. This line transmits changes in the negative air-inlet pressure from the underside of the mixer's diaphragm.

The regulator is automatically adjusted. It delivers gas at the prevailing negative air pressure. Gas and air-inlet pressures of the valve ports remain in balance.

Crucial Spot—The mixing valve diaphragm plays a crucial role. The slightest leak impairs the accuracy of the entire unit. The diaphragm must remain flexible enough to respond to small differential pressures.

In the larger units, this diaphragm must be strong enough to support up to 75 lbs. And it must operate with a fixed accuracy in different types of gases — natural, manufactured and propane.

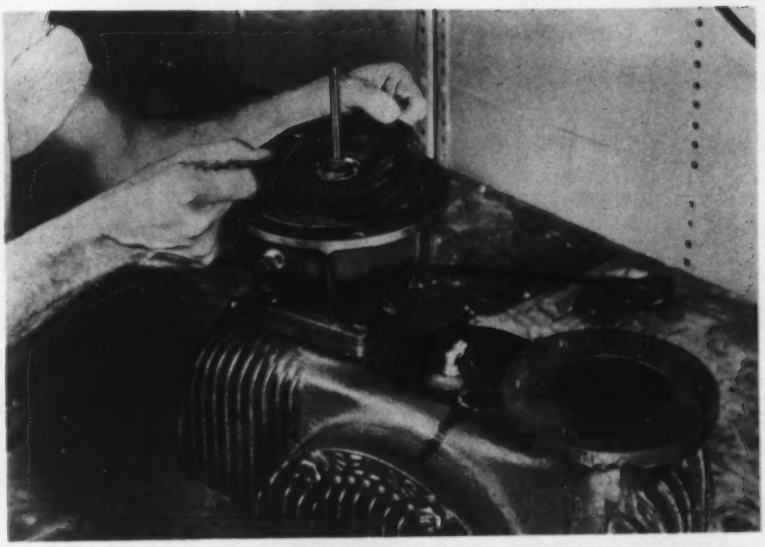
In the case of the compressor diaphragm, service demands are even more severe. This diaphragm controls normal outlet pressure up to 3 psi. Special units have been designed with outlet pressures up to 6 psi. When the compressor operates on the bypass—for instance, when burners are out—the diaphragm may be exposed to a large amount of heat.

For years, Selas used leather diaphragms in both the mixing valve and the compressor. But they posed several problems.

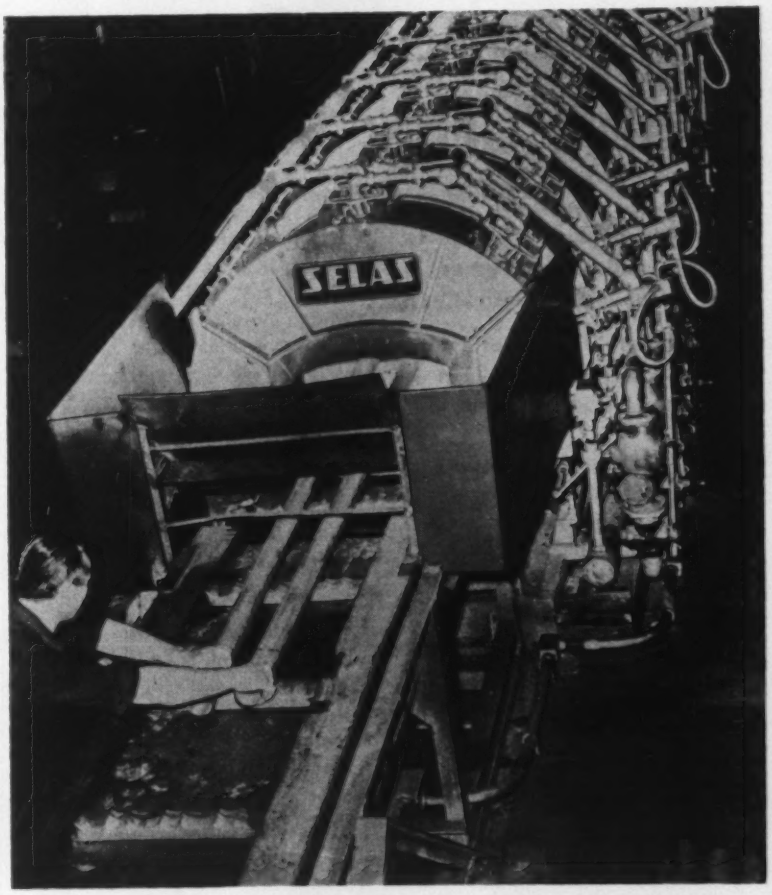
Breakdown Eliminated—After a few months service, leather diaphragms have a tendency to dry out. They lose their flexibility and often crack. The combustion controller then has to be taken apart and the diaphragm oiled or replaced.

Replacement takes about an hour for the compressor diaphragm. It often takes longer for the mixing valve diaphragm—especially in the larger units.

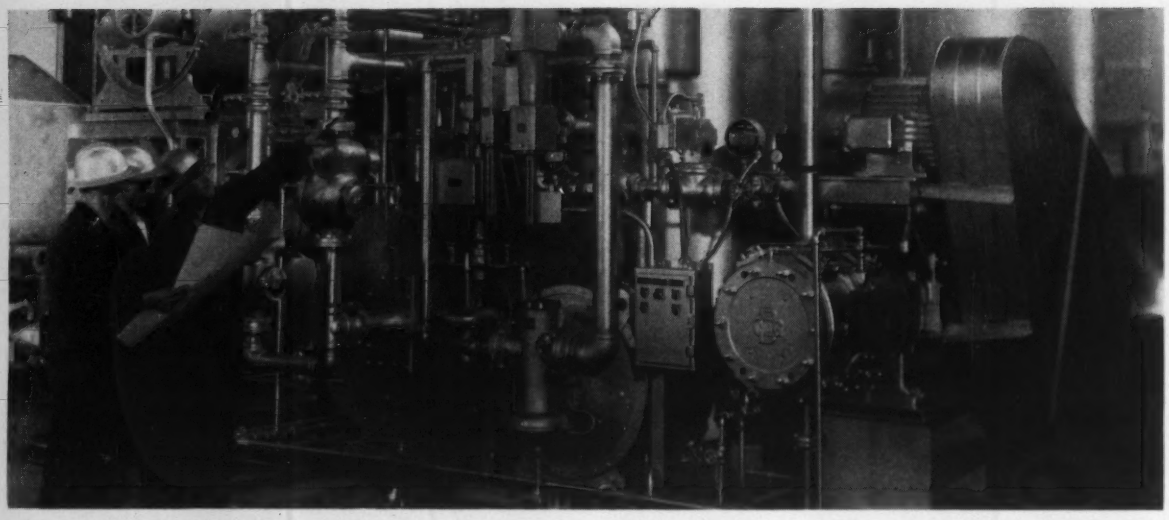
After two years of actual field tests, Selas has found that all synthetic diaphragms in service have retained their accuracy. None have needed replacement or maintenance.



IMPORTANT PART: Operator places a synthetic diaphragm in position. It fits over the pressure-governor section of a combustion controller. Use of the synthetic diaphragm provides trouble-free lasting service.



SEVEN-BARREL FURNACE: Combustion controller allows radiant burners to maintain proper temperature. Worker at Wallingford Steel Co., Wallingford, Conn., lines up stainless steel tubing on conveyor system.



NITROGEN GENERATOR: Burning a hydrocarbon in a catalytic-combustion chamber is the principle behind a new nitrogen generator. Available in capacities up to 10,000 cfh, the unit delivers 100-psig pressure.

Atmosphere-Generator Produces High-Purity Nitrogen

Nitrogen acts as a purge to eliminate undesirable gases in many metalworking operations.

A completely automatic unit delivers an atmosphere that is 99.99-pct pure nitrogen.

▪ Nitrogen serves the metalworking industry in many ways. It acts as a carrier atmosphere in various operations. These include: bright hardening, annealing, normalizing, sintering, gas carburizing and carbonitriding.

A new unit, made by the Gas Processing Div., Lindberg Engineering Co., Chicago, produces an atmosphere of 99.99-pct pure nitrogen. Called the Hyni generator, this unit suits any application where high-purity nitrogen is needed.

Automatic Controls — Once the generator is started, operation becomes completely automatic. An electrical timer and electrically-controlled valves regulate the absorbing, heating and cooling cycles.

Fuel gas and air are drawn through visual flowmeters into a combustion chamber. A proportioning mixer regulates and controls the input gas-air ratio.

Prior to combustion, the mixture is compressed to 1-psi pressure. A motor-driven compressor does the compacting. Then the air-gas mixture passes through to a lighting torch, a volume-control valve, an automatic fire-check and a burner.

Complete Breakdown — Burning occurs in a catalyst-filled chamber. The catalyst assists in combustion to obtain complete separation of the hydrocarbons to carbon dioxide, carbon monoxide, hydrogen, water vapor and nitrogen.

Residual carbon monoxide and hydrogen depend upon the air-gas ratio setting.

A recorder - controller maintains combustion control to offset changes in fuel analysis. If the analysis varies from that desired in the end product, the controller adds or subtracts gas from the air-gas ratio by means of a pneumatic valve.

After combustion, the hot gases enter the gas-to-air heat exchanger. These gases heat the blower air used for reactivation.

Traps Condensate — Next, the gases enter a water-cooled condenser which partially condenses out the water vapor. Cooled gas and condensate pass through a water separator. The condensate drips out through a trap.

The heating or reactivation cycle consists of passing blower air through the air-gas heat exchanger to heat the air to 600°F. The unit vents all CO_2, SO_2 and NO_2 to the outside.

Cooling takes place in a closed system where a small portion of the purified gas purges the air from the system. The gas then recirculates through a gas booster and a water-cooled surface condenser.

Low-Cost Operation—One of the advantages of this process is its low cost. The Hyni generator produces nearly pure nitrogen for only $0.17 to $0.20 per 1000 cu ft. This figure doesn't include maintenance or amortization.

Maintenance costs are reported to be low. There is no corrosion problem, no loss of absorbent, and no possibility of dryer contamination by carry-over. These factors reduce supervision and operator attention.

A manual reset safety valve protects the generator in the event that the gas-supply pressure falls below the minimum setting. Signal lights and horn alarms indicate this condition.

A water-flow switch on the cooling system triggers an alarm if the water drops below the safe setting.

High-Purity Output—The processed atmosphere can be delivered at up to 100-psig pressure. This is often desirable for storage in receiver tanks and for distribution purposes. The generator is available in capacities of 1000 to 10,000 cfh.

Instruments automatically control the purity of the end product. Control is accomplished on residual oxygen when operation is on the oxidizing side. Hydrogen maintains control when the unit operates on the combustion side.

Here's how an Hyni unit is going to serve one of the world's largest heat treating furnaces—nearing completion at a west coast aircraft and missile plant.

The huge vertical gantry-type furnace will take a part almost 27-ft long. It has a working diameter of 7 ft. Vertical design cuts down warpage and saves space.

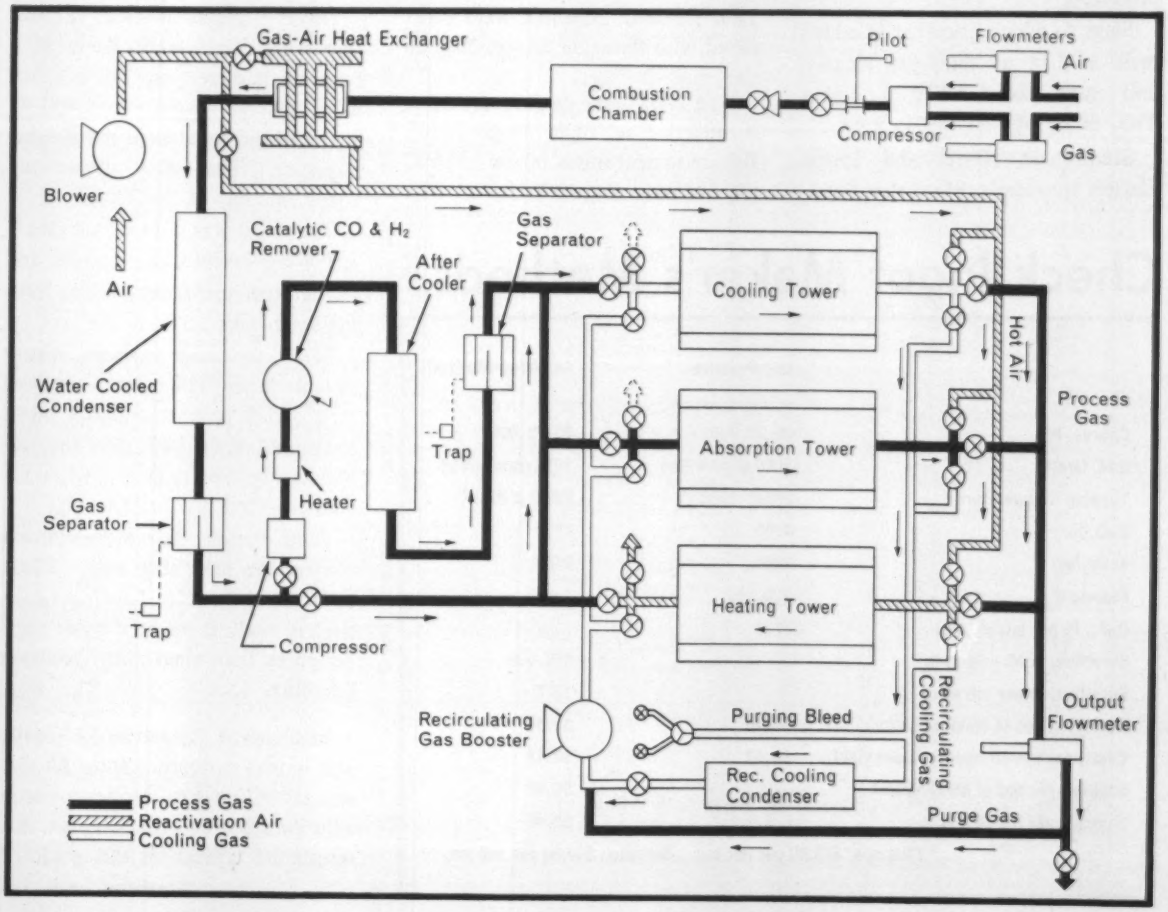
This Hyni generator will insure safe, low-cost purging during loading and quenching operations. The pure atmosphere eliminates contamination problems during heat treatment.

Dry Process—The unit provides high-purity nitrogen by a completely automatic process. Carbon dioxide, water vapor, sulphur, hydrogen sulphide and traces of nitrogen oxides are removed in a dry absorbent material called a molecular sieve.

Absorption units function automatically. Once the generator is started, operation becomes completely automatic and continuous.

There is no wear out or deterioration of the solid absorbing material. It lasts indefinitely when the unit is operated in the recommended manner.

Here's How Unit Delivers Ultra-Pure Nitrogen



Low-Cost Slag Thinner Reduces Refractory-Attack Damage

By R. K. Buhr and W. A. Morgan—Physical Metallurgy Div., Dept. of Mines and Technical Surveys, Ottawa

From an economic viewpoint, there's no doubt that a new slag thinner can save money.

It costs about one third as much as fluorspar. And it minimizes refractory attack.

■ Tests prove the effectiveness of a new slag thinner. Called Sorelflux, the newcomer costs about one third as much as fluorspar. And it doesn't alter the properties of steels produced.

Slags to which Sorelflux is added melt as fast as fluorspar slags—and even faster when a higher TiO_2 grade of Sorelflux is used.

Studies on 10-ton and 25-ton electric furnaces confirm that Sorelflux serves steelmakers as well as or better than fluorspar.

Check Composition—Tests have been made on cyclone tailings from ilmenite iron-ore deposits. Composition of these deposits appears in the small table.

This material was designated Sorelflux. Additions of Sorelflux and fluorspar were made to slags. Then, their effects on the properties of the steels produced were compared.

Trials have also been run in which this Sorelflux and 10-pct TiO_2 grade of Sorelflux were compared with fluorspar in speeding up slag melt-in time.

Test data indicate that Sorelflux is effective at high temperatures. But, at temperatures below 1535°C the fluorspar slag melts faster.

These Components Form New Slag Thinner

	Pct		Pct
TiO_2	5.75	Cr_2O_3	0.06
FeO	5.2	V_2O_5	0.05
Fe_2O_3	4.6	MnO	0.04
SiO_2	46.4	C	0.58
Al_2O_3	21.9	S	0.27
CaO	7.0	Na_2O	4.1
MgO	2.4	K_2O	2.6

Direct Comparison—Six double-slag basic heats were made in a Lectromelt direct-arc, 250-kva furnace. Charge weights were 500 lb. Three of the heats were made using fluorspar. The other three used equal amounts of Sorelflux.

The metal was poured into standard 4-leg keelblocks. Tensile and impact specimens were taken from the keelblocks.

Metal and slag analyses appear in table form. The columns marked 1, 2 and 3 refer to samples taken at the end of the boil, after the second slag became molten—before reduction—and just prior to tap.

Cone fusion tests were carried out on the final slag only. These tests show that the fluorspar slags tend to melt at slightly lower temperatures than slags which contain Sorelflux.

Mechanical Properties — Tensile and impact properties show no significant differences in heats made with fluorspar or with Sorelflux. All results are typical for this grade of

Continued on p. 112

Check Ingot Maker's Methods

	Old Practice	Sorelflux Method
Charge, lb	70–72,000	70–72,000
SAE Grade	1010 semi-killed	1010 semi-killed
Tapping Temperature	2900°–2950°F	2900°–2950°F
CaO, lb	4700	4700
Scale, lb	2400	2400
Fluorspar	600–660	
CaF_2, lb per ton of steel	17.8	
Sorelflux, total weight, lb		400–500
Sorelflux, lb per ton steel		12.7
Costs, per ton of steel melted*	$0.40	$0.10
Costs, per ton of ingots (75-pct yield)	$0.53	$0.13
Savings, per ton of steel melted		$0.30
Savings, per ton of ingots		$0.40

* Fluorspar $45.00 per net ton. Sorelflux $15.00 per net ton.

Compare the Analyses of Metal and Slag for the Six Heats

Element or Compound	Heat A1029			Heat A1030			Heat A1031			Heat A1035			Heat A1063			Heat A1064		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Metal	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct
C	0.08	0.21	0.35	0.06	0.21	0.32	0.08	0.24	0.30	0.08	0.21	0.30	0.06	0.23	0.25	0.04	0.26	0.27
Mn	0.13	0.35	0.56	0.086	0.36	0.77	0.10	0.35	0.56	0.07	0.28	0.81	0.10	0.35	0.75	0.10	0.30	0.55
Si	0.014	0.019	0.13	0.009	0.059	0.12	0.013	0.05	0.22	0.015	0.014	0.24	—	0.03	0.23	0.002	0.034	0.17
S	0.028	0.021	0.022	0.031	0.029	0.027	0.035	0.033	0.033	0.028	0.027	0.020	0.026	0.023	0.013	0.023	0.021	0.017
P	0.006	0.009	0.012	0.008	0.011	0.019	0.013	0.013	0.018	0.012	0.014	0.019	0.005	0.005	0.008	0.005	0.005	0.007
H_2	2 ppm	2 ppm	3.2 ppm	2.4 ppm	4.9 ppm	4.7 ppm	2.1 ppm	4.7 ppm	4.8 ppm	1.6 ppm	3.3 ppm	3.7 ppm	3.2 ppm	5.5 ppm	4.1 ppm	2.9 ppm	5.2 ppm	4.4 ppm
O_2			0.009			0.011			0.010			0.010			0.009			0.0095
N_2			0.007			0.002			0.004			0.008			0.003			0.003
Slag																		
Fe	18.1	11.7	6.0	21.4	6.1	5.1	14.4	9.0	1.2	15.2	8.6	2.4	30.7	13.5	3.6	28.0	10.9	3.8
SiO_2	16.6	15.6	19.5	15.6	14.8	21.7	19.8	18.2	24.5	25.3	20.4	26.8	12.9	12.9	21.1	15.2	17.9	24.1
CaO	34.0	45.6	35.9	25.1	64.8	40.3	28.5	45.8	49.1	30.2	52.3	52.9	24.2	52.0	50.0	25.2	47.7	54.7
MgO	14.4	12.7	24.9	16.7	5.0	19.3	17.8	11.6	11.3	15.6	9.2	10.0	6.6	6.8	16.6	6.4	5.1	7.0
Al_2O_3	3.3	1.5	5.4	4.2	0.74	6.3	5.7	4.6	6.9	4.7	0.64	4.2	2.5	0.70	2.5	3.8	4.4	4.3
MnO	6.5	5.9	4.9	6.5	2.4	2.2	7.1	5.3	1.6	5.1	4.9	0.86	6.6	5.4	1.2	6.6	5.1	2.6
C	0.03	0.05	0.08	0.08	0.10	0.13	0.08	0.09	0.45				0.12	0.34	0.22	0.07	0.28	0.24
S	0.14	0.17	0.28	0.07	0.15	0.18	0.09	0.12	0.11	0.08	0.06	0.05	0.12	0.14	0.21	0.07	0.11	0.15
P_2O_5	0.30	0.28	0.12	0.26	0.18	0.10	0.25	0.22	0.07	0.21	0.34	0.041	0.39	0.36	0.16	0.44	0.32	0.28
CaS				0.10	0.20	0.24	0.09	0.09	0.26									
CaF_2	1.28	4.18	5.07	0.58	9.5	2.7	0.14	0.33	0.72				2.1	4.3	2.7	0.42	0.15	0.42
Na_2O							1.5	1.4	1.2	1.6	1.3	1.4				1.16	0.96	0.55
K_2O							0.10	0.45	0.12	0.15	0.25	0.15				0.18	0.17	0.14
TiO_2													1.4	0.84	0.42	1.7	1.4	1.1
2nd Slag Make-Up	10-lb lime 2-lb spar			10-lb lime 3-lb spar			10-lb lime 2-lb Sorelflux			10-lb lime 3-lb Sorelflux			15-lb lime 3-lb spar			15-lb lime 3-lb Sorelflux		
Basicity																		
$\frac{CaO + MgO}{SiO_2 + P_2O_5}$	2.53	3.67	3.10	2.64	4.65	2.74	2.31	3.11	2.46	1.80	2.96	2.34	2.31	4.43	3.13	2.02	2.90	2.53

Investigate Mechanical and Molten Properties

	Heat Numbers					
	A1029	A1030	A1031*	A1035*	A1063	A1064*
U.T.S., psi	75,250	76,150	79,850	78,200	74,450	73,850
Yield, psi	44,200	47,450	49,900	50,100	41,800	42,050
Elongation, pct in 2 in.	31.5	29.25	31.0	32.25	29.25	27.0
Reduction in Area, pct	43.05	41.5	49.45	52.75	54.15	48.1
Impact Strength, ft-lb	29	32.5	31	39	61	48
Impact-Strength, ft-lb (−40°F)	6	8	9	11	13	10
Start to Slump, °C	1375	1380	1385	1530	1530	1575
Molten at, °C	1595	1540	1575	1640	1610	1625

* Sorelflux used with these heats.

steel in the normalized and drawn condition.

Decrepitation of the samples on either furnace or air cooling suggests the presence of di-calcium silicate.

Two Canadian companies now use Sorelflux as a replacement for fluorspar. One company produces semi-killed AISI 1010 ingots: The other makes steel castings. Both melt in electric furnaces. Here's a report on their findings.

The ingot producer operates two 25-ton electric furnaces. This company melts half the charge with half the lime. Then, they back charge the remaining scrap with all the slag-making materials.

When all the charge melts, the slag becomes very fluid. After adjusting the analysis, 80-90 pct of the slag is slagged off and the heat is tapped in a ladle. The ingot maker adds ferrosilicon and ferromanganese to the ladle.

Compare Savings—Use of about 500 lb of flux produces a very fluid slag. At the present time, the ingot maker uses 400 lb of Sorelflux per heat. A self-explanatory table gives a rundown of ingot costs and savings.

Another Canadian plant operates two 10-ton, basic-electric furnaces. Their average charge is 19,500 lb of heavy-melting scrap and 350-375 lb of burnt lime.

After all the charge melts, more lime is added. About 60 lb of fluorspar and 200 lb of iron ore are normally added at this point.

After the analysis is adjusted, manganese is added into the furnace—just prior to tapping. This causes the slag to become very fluid. At this stage, the steelworkers tap the heat into a ladle with 50-pct FeSi and aluminum. All of the slag is next slagged off in the furnace pit.

Low - Cost Castings — Sorelflux now replaces the spar pound for pound. As a result, casting costs have tumbled. A breakdown on the casting costs appears in table form.

Little corrosion at the slag line of both the furnace and the ladle is reported. With the high operating temperatures, refractory attack used to be quite a severe problem.

Savings from the lessening in refractory attack are important. And these savings are a bonus—over and above the savings in flux costs.

From the foregoing, it seems that Sorelflux — particularly the high TiO_2 grade—can replace fluorspar in steelmaking slags. Commercial usage indicates that it will replace fluorspar pound for pound. There is a chance that even less Sorelflux can be used to give equivalent fluidity.

Here's Casting Costs Rundown

	Old Practice	Sorelflux Method
Charge, lb	19,500	19,500
SAE Grade	1075	1075
Tapping Temperature	3100°-3200°F	3100°-3200°F
Fluorspar, lb	60	
Sorelflux, lb		60
Cost, per ton melted*	$0.135	$0.045
Savings, per ton melted		$0.09
Savings, per ton of castings (75-pct yield)		$0.12

* Fluorspar $45.00 per net ton. Sorelflux $15.00 per net ton.

Roll Stainless Forms to Shape

Most Plants Can Handle Shapes With Existing Dies

Design flexibility can make a big difference in selection of a building material.

Roll-formed sections of stainless steel are finding increased use in the building field.

■ Architects and builders are learning that roll-formed sections of stainless steel have many advantages, not the least of which is savings in cost.

In many instances, roll forming has made stainless-steel building components competitive with less durable materials, even where quantities are small, according to Armco Steel Corp., Middletown, O.

What Determines Cost — Actually, the quantity has far less to do with the unit cost of roll-formed sections than two other factors: Cost of new dies and cost of new machines. If the section an architect designs can be rolled with the existing dies of a machine, the cost problem is solved.

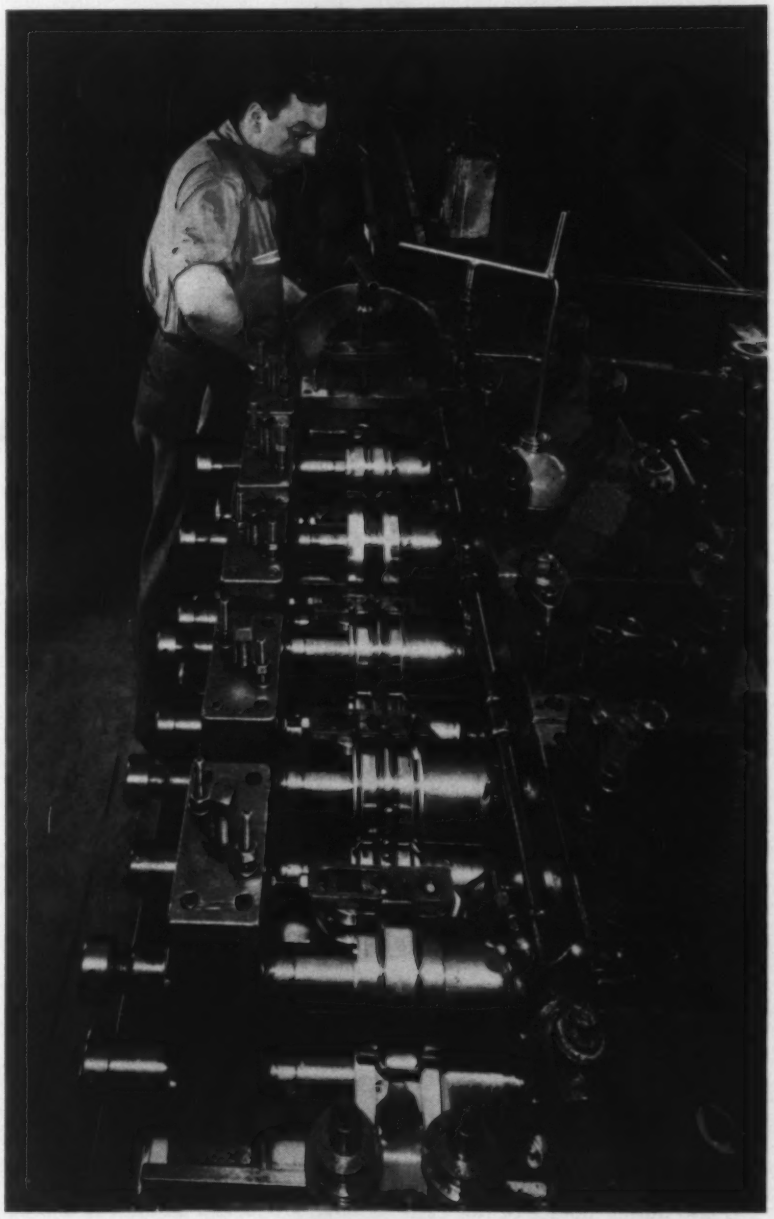
If the architect's design is not too complicated, chances are that most commercial roll - forming plants already have the dies and the machines to roll it.

Complex configurations can be roll - formed inexpensively when they cannot be made any other way at a reasonable cost. The additional cost involved in roll-forming would be justifiable compared to other and more expensive methods of doing the job.

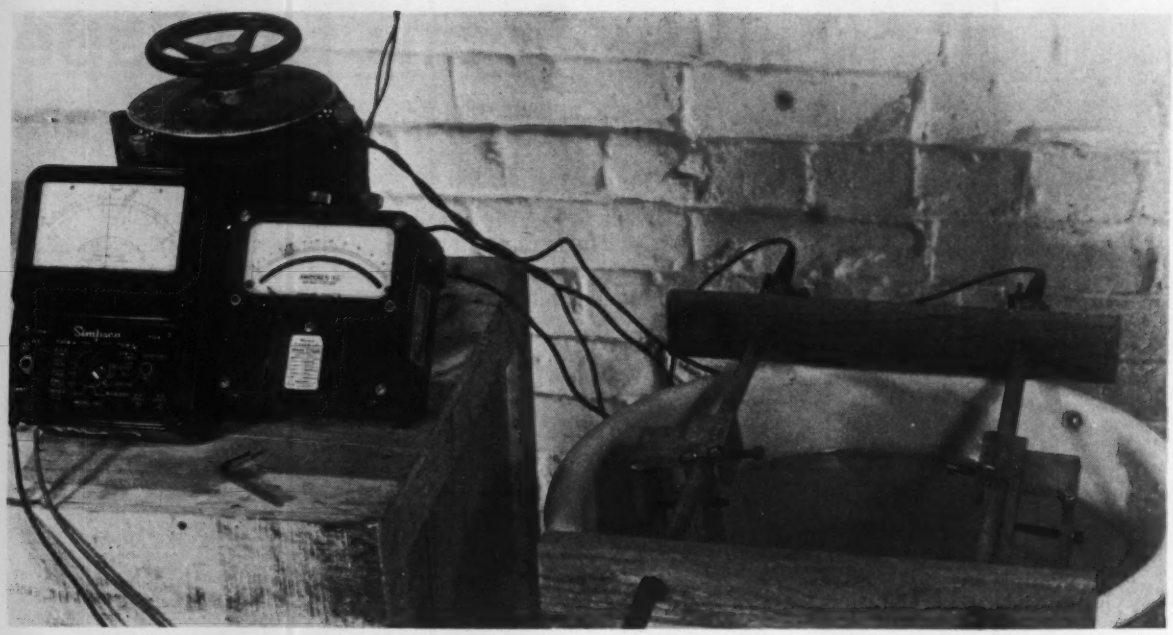
Good End Results—Besides providing the material to architects and builders at the same or lower cost, there are other important advantages in roll-formed stainless-steel sections. For one, roll-forming insures excellent quality and uniformity from the start of the run to its finish.

In addition, stainless steel work-hardens rapidly and evenly as it passes through the successive rolls, making it stronger when it comes off the roll-forming mill than when it entered. Use of lighter gages can save on cost of material.

Mullions, trim, railings, moldings and store fronts are just a few examples of profit possibilities in the building field.



TURNS OUT SHAPES: Twelve-stand roll-forming machine turns out custom shapes. Roll forming insures quality and adds strength to stainless.



BASIC SETUP—Until productive outputs demand larger units, the fluoride anodizing process can be performed in a simple plastic bucket. Very few electrical components are needed.

Process Cleans Cast Magnesium

Fluoride Anodizing Precludes Corrosion and Stain

By **H. R. Bullock**—Section Manager, Metals Lab., Equipment Div., Raytheon Co., Maynard, Mass.

Magnesium castings tend to corrode and stain even while being machined.

A protective coating can be applied to end this corrosive attack in the shop, in transit and in storage.

▪ A low-cost cleaning process, now available in the U. S., reduces corrosion on magnesium castings. It is used at intervals between machining operations to prevent corrosion and stain during handling.

A supplementary oiling will provide protection during shipment and also during storage of raw castings. The name of this process is fluoride anodizing.

Other tangible production benefits are the elimination of surface chlorides and metallic inclusions from as-cast or machined surfaces. This process is very good for use on finished surfaces since no dimensional changes result.

Proven Merit — The fluoride anodizing process was invented in England by Dr. W. F. Higgins of Magnesium Elektron Ltd. It has proven very successful. The first use of the process in the U. S. has been at Raytheon Co., Maynard, Mass.

Several hundred test panels and small production castings have been processed in Raytheon's laboratory with complete success. Humidity tests have confirmed the work done in England and a further study carried out at the suggestion of Dr. Higgins has resulted in sound uses.

This process offers many benefits. Here are just a few: The pure magnesium obtains a clean surface —free from any kind of contamination. This metal has a high-corrosion resistance compared to commercially available magnesium. Complete fluoride cleaning improves resistance to attack by a factor of 10 to 100 times.

Clean Under-Surface—There is no measurable dimensional change due to the process. All impurities are removed from the surface and where these were located a void

remains. The surface in the void, however, is clean magnesium.

A surface completely covered with impurities will show surface roughening. Such a casting should be rejected.

Prevent Etching — A good economical method of cleaning a casting is by grit blasting. However, the grit leaves ferrous particles imbedded in the surface. These particles start corrosion.

Removal of these particles by acid etching requires the removal of a considerable depth of material, especially where the acid bath is not fresh. In such case, a badly contaminated bath can add iron to the surface.

At least 0.030 to 0.040 in. must be removed by etching to completely eliminate the effects of grit blasting. Thus far this conclusion can be made: By using the fluoride process after grit blasting, the surface of the magnesium is not affected.

Specimens which were fluoride anodized were run with the acid etched specimens. They show no loss in thickness. The samples are machined prior to blasting to improve accuracy of measurement.

Added Protection—The film of magnesium-fluoride, left on the surface, has some good corrosion-inhibiting properties. But, it is too thin to be measured by ordinary methods. The film is oiled and used as added protection for castings while in transit.

Tests are in progress to study the film's ability to serve as a paint-bonding base. The fluoride anodizing process also serves as a quality controller.

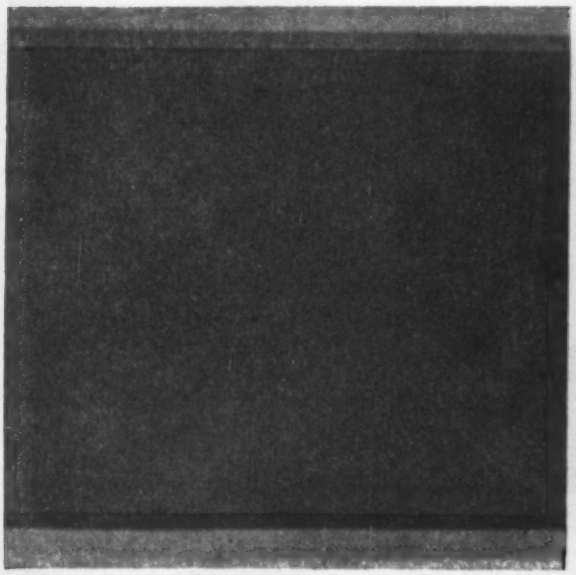
It will show up surface defects such as oxide folds or flux inclusions. These are pursued and removed in the cleaning process. And they leave visible surface voids. Surface defects, not apparent at this stage, will be readily detected in Zyglo — a non-destructive testing process.

The physical equipment needed to apply the process is simple. It consists of: A tank of ammonium-bifluoride solution (5-15 pct); an ac-power source of up to 120 v, capable of supplying a current of 30 to 100 amp—depending on the area of the work pieces; a means of voltage control; and an ammeter and a voltmeter.

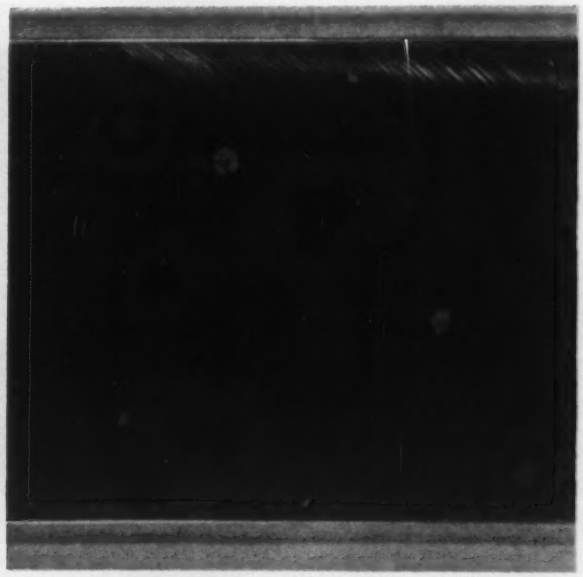
Possible Uses — Magnesium clamps with knife edges hold the work pieces submerged and supply current to them. Two pieces of about equal area are done together. Since ac current is used, each piece becomes alternately the cathode and anode.

A normal process time with adequate power supply is 10 to 15 minutes. Much longer times have been used without detrimental results. The process is self limiting. As soon as the current drops rapidly the operation is finished.

Most of the benefits so far examined apply to castings. But the process should show equal merit in cleaning wrought alloys. Surface contamination from a sheet rolling operation is readily removed. It's also quite easy to remove the graphite lubricant following deep-drawing operations. These are currently being investigated.



CLEAN CASTING—The test panels are cast magnesium alloy EZ33A. This sample has been fluoride anodized and exposed to humidity for 100 hours. No corrosive effect is visible on the surface.



HUMIDITY EFFECTS—The sample above is machined and untreated. The white spots and specks represent corrosion caused by surface chlorides after 24 hours in a humidity chamber.

Stamped Parts Keep Costs Low

Vulcanized-Fiber Stampings Serve as Electrical Barriers

Tooling for new products can take time—and prove costly.

Here's how simple stamping operations solved a circuit-breaker design problem.

■ Tooling often adds up to a major part of overall costs when electrical-insulation parts are molded. Such costs can be cut if parts are stamped or punched from sheet materials.

Savings are possible, says the Taylor Fibre Co., Norristown, Pa., if the design can be broken down into flat pieces which—when assembled—perform the same function as a one-piece molded part.

It's true that extra assembly steps will result. But lower die costs for stamping and punching more than offset the added assembly problems. The resultant savings are especially important on short runs.

Case History—Use of vulcanized fiber at the Walker Electrical Co., a subsidiary of I-T-E Circuit Breaker Co., Atlanta, provides a case in point.

Walker recently found a neat solution to a tricky design headache in the production of small blank-space barriers. These barriers insulate bus stabs (branch-circuit connecting strips) of opposite polarity on electrical panel boards.

Each panel board contains a chassis mounting from 4 to 42 circuit breakers. End result is a compact and efficient line of bolted-type, circuit-breaker panels. If a purchaser doesn't wish to use a panel board's full capacity, he inserts an insulation barrier — which meets Underwriter Laboratory requirements—between the live bus stabs. The blank-space barrier takes the place of a circuit breaker.

Plan Campaign—Walker's engineers first checked out the costs of molded barriers. They found that mold costs would run about $1500. They also noted that the mounting-screw aperture would have to be designed as a slot rather than a hole. Should the screw not be tightened properly, a certain amount of undesirable play in the barrier would result.

Next, the engineers studied the idea of having the part postformed from vulcanized-fiber sheet. But they found the required bend would be too extreme.

The problem was finally solved by designing the part so that it consists of two pieces. Both pieces are made from vulcanized-fiber sheet.

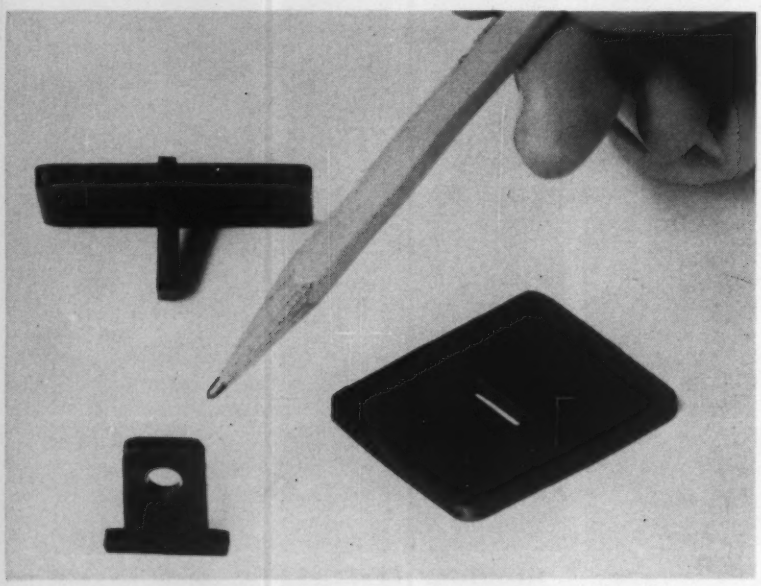
Good Return—The result is the present economical barrier. It's punched with a die that cost about 20 pct of what a mold would have cost. Thus about $1200 are saved in die costs.

At the same time, the parts are punched with a round hole that suits the screw's diameter. In the event of an improperly tightened mounting screw, the round hole ensures proper positioning of the barrier.

The punch die permits two barrier assemblies—four pieces in all—to be stamped at one time. A small T-shaped "ear" is then force-fitted through a slot in the center of—and at right angles to—the larger piece. Mounting screws through the ear holes secure each barrier to its bus stab.

Walker's new panel board assemblies permit the company to offer more compact equipment. Smaller, physically-closer breakers, positioned directly over the bus work, keep each panel box 15-in. wide. This represents a 25-pct space savings.

Bolted-type breakers are specified in many industrial applications. They also meet wide commercial usage.



FORCE-FIT ASSEMBLY: Two stamped pieces form a rigid, high-strength assembly. Round hole in T-shaped stamping ensures proper positioning of blank-space barrier. Barrier meets use on electrical panel board.

Anneal 430 Trim Stock and All Other Stainless Strip to a Durable, Mirror Finish *Without Chrome Depletion* in

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New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 125.

Tube Fittings

Ten types of Teflon tube fittings are described in a bulletin. The fittings eliminate the need for glass ball joints and other intricate glass fittings, and connectors. The design of the fittings permits considerable variation in tube size. Specifications and prices for the complete line of fittings are listed in the bulletin. (Beckman Scientific & Process Instruments Div.)

For free copy circle No. 1 on postcard, p. 125

Bright Chromate

For zinc and cadmium, a leach-type bright chromate is fully described in a technical data sheet. The new product eliminates handling of liquid acid in chromating. It is a powdered material which is dissolved in water, and used to produce clear bright or iridescent bronze chromate finishes on zinc or cadmium plate. Only one product need be stocked for each finish. (MacDermid Inc.)

For free copy circle No. 2 on postcard, p. 125

Gear-Shaving Manual

Profusely illustrated, a two-color 18-page reference manual gives essentials of rotary gear shaving. Prepared especially for gear designers, gear manufacturing engineers, gear production supervisors and gear production machine operators, this concise treatise covers basic gear production and gear shaving information. Both line drawings and photographs are used to illustrate the principles and considerations. An application table is included on the back cover for selecting shaving machines for both external and internal gears. (National Broach & Machine Co.)

For free copy circle No. 3 on postcard, p. 125

Manual Hardsurfacing

Basic information for manual hardsurfacing is contained in a 12-page bulletin. The bulletin discusses the economics and metallurgy of hardsurfacing, analyzes the various conditions which demand surfacing, and provides information concerning electrode selection and procedures which will produce the type of surfacing desired. (The Lincoln Electric Co.)

For free copy circle No. 4 on postcard, p. 125

Molybdenum

A non-technical, descriptive booklet on molybdenum products is available for those with a general interest in the unique combination of properties found in these materials. The 24-page booklet, on molybdenum and molybdenum-base alloys, gives full details on the various sizes, forms, conditions of use, tolerances, weights, and methods of identification of products now available for commercial use. The booklet also discusses at length the wide range of uses to which the products are well suited in the electrical, electronic, missile, air-

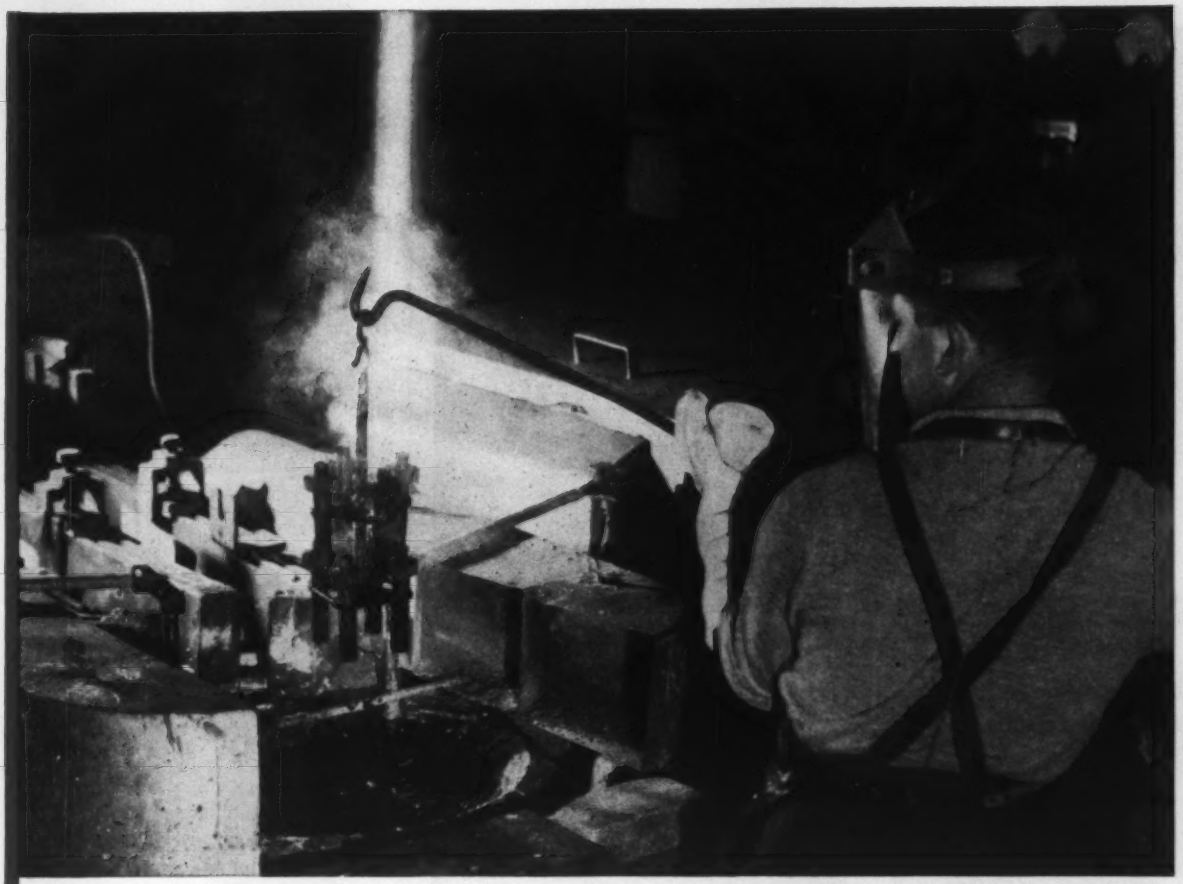

Photo by Etienne Bertrand Weill, Paris.
Perliton carburizing bath in French metal plant.

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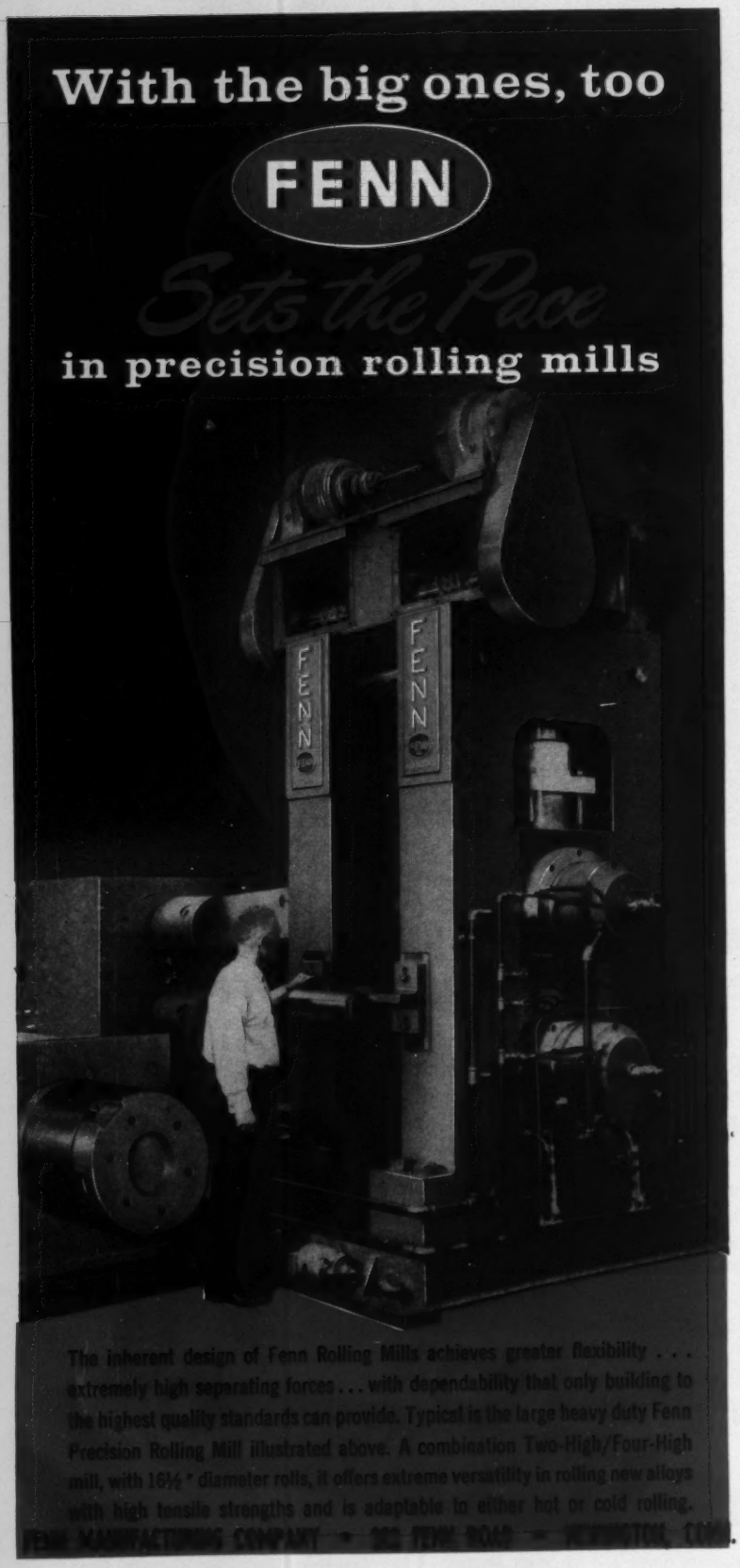
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The inherent design of Fenn Rolling Mills achieves greater flexibility . . . extremely high separating forces . . . with dependability that only building to the highest quality standards can provide. Typical is the large heavy duty Fenn Precision Rolling Mill illustrated above. A combination Two-High/Four-High mill, with 16½" diameter rolls, it offers extreme versatility in rolling new alloys with high tensile strengths and is adaptable to either hot or cold rolling.

FREE LITERATURE

craft, nuclear energy, metal working, chemical, glass, and other fields. (Climax Molybdenum Company, Div. of American Metal Climax, Inc.)

For free copy circle No. 5 on postcard, p. 125

Furnace Equipment

The subject matter of a 16-page bulletin is furnace equipment for heat treating stainless steel, as strip, sheet, tube, wire, bar, and formed and machined products. The bulletin pictures and describes the types used in each operation; it covers the latest developments in continuous, semi-automatic and batch methods for heat treating stainless-steel products. (The Drever Co.)

For free copy circle No. 6 on postcard, p. 125

Temperature Controls

Simple and inherently stable temperature-control packages are described in a 12-page bulletin. The controls are applicable to a wide variety of industrial processes. The bulletin explains operation, circuitry and safety features of the three basic types of thermocouple-actuated, temperature-control packages, including the proportioning model that is capable of holding temperature to $\pm 1°F$ of set point. The bulletin also includes prices and complete ordering information. (Assembly Products, Inc.)

For free copy circle No. 7 on postcard, p. 125

Flame Spray Process

Providing engineering data on coatings of metals, ceramics, carbides and other high melting point materials, an engineering data bulletin deals with basic flame spray processes. This 16-page bulletin covers the metallizing process which sprays powdered metals, including tungsten carbide and self-fluxing alloys of the boron-silicone, nickel, chromium type and refractory ceramics, such as aluminum and zirconia; and the new plasma flame spray process which develops temperatures up to 30,000°F, and

The American Brass Company
Waterbury 20, Conn.

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There are now four free-cutting, high-conductivity Anaconda coppers that broaden the combinations of mechanical, physical, and fabricating properties available for boosting production and cutting costs of high-conductivity parts. They are furnished chiefly in rod and bar, but are available also as extruded shapes and, except for the leaded coppers, die-pressed forgings of simple design. All have good cold-working properties.

Leaded Copper-126 and Deoxidized Leaded Copper-129 have slightly higher electrical conductivity—98% IACS annealed, 95% IACS, minimum. The difference between them is that Alloy 129, being deoxidized, is not subject to hydrogen embrittlement when annealed or furnace-brazed in reducing atmospheres. Neither leaded alloy is recommended for hot working.

Tellurium Copper-127 and OFHC Sulfur Copper have an electrical conductivity rating of 95% IACS annealed, 90% minimum. Both may be extensively hot worked and neither is subject to hydrogen embrittlement. Tellurium Copper-127 has the advantage of retaining its mechanical properties at temperatures higher than those tolerated by the other free-cutting coppers—and hence is widely used in the welding and cutting-tip field.

The free-cutting coppers may be machined at cutting speeds approaching those used for machining Free-Cutting Brass. For Tellurium Copper-127, however, carbide-tipped tools are recommended as the inherent copper telluride particles cause somewhat greater tool wear.

6047

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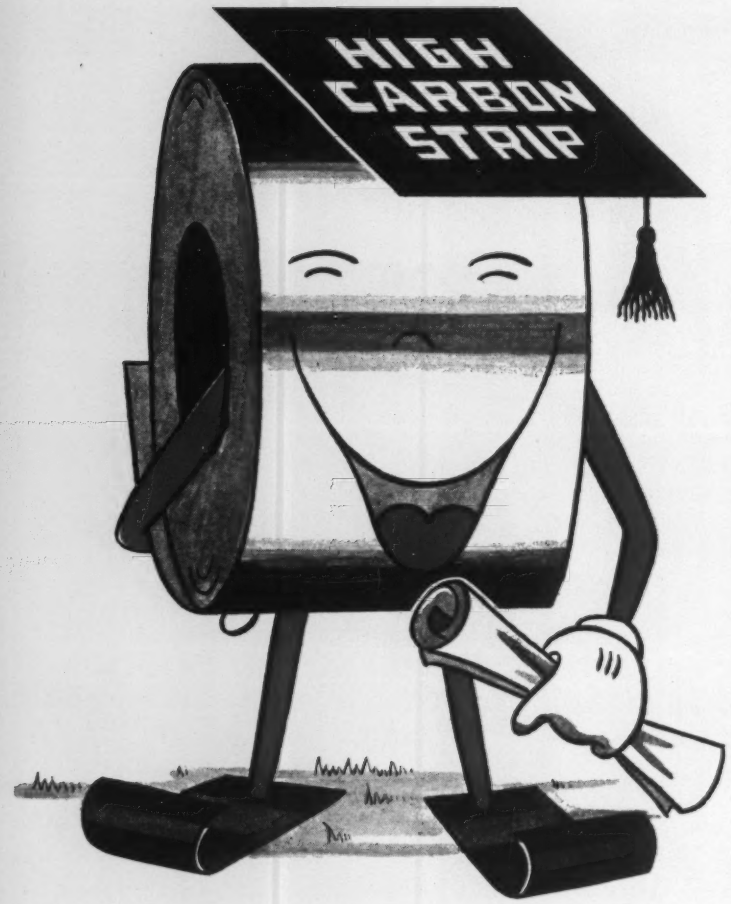
Made by The American Brass Company



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FREE LITERATURE

can spray any material that can be melted without decomposition. The bulletin includes tables and charts on specific characteristics of these coatings, such as hardness, tensile strength, and bond strength. (Metallizing Engineering Co., Inc.)

For free copy circle No. 8 on postcard, p. 125

Rubberized Abrasives

For industrial use, an application manual includes information concerning the many uses for rubberized abrasives. In addition, case histories on a variety of typical applications and a copy of the latest company catalog is included. The most efficient methods for mounting, dressing and trueing and recommended operating speeds are given in brief but complete form. Actual field applications are described. (Cratex Mfg. Co., Inc.)

For free copy circle No. 9 on postcard, p. 125

Barrel-Finishing Media

Reporting on barrel-finishing media, a bulletin offers complete, concise information. Information on the random-shape forms is augmented by photographs of the new media. The bulletin also contains a table of 16 screen mesh sizes, and illustrates case histories of results achieved with the media in actual commercial barrel-finishing processing. (Lord Chemical Corp.)

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Perforated Steel

Engineering data for complete specification of heavy-gage perforated metal is outlined in a 40-page brochure. The data covers applications of perforated metal as screens, strainers, dryers, separators, supports, guards, ventilators and drains. Data in the brochure includes dimensions, unit weights, calculation of open area, materials selection, and fastening methods. (Cross Perforated Metals, National-Standard Co.)

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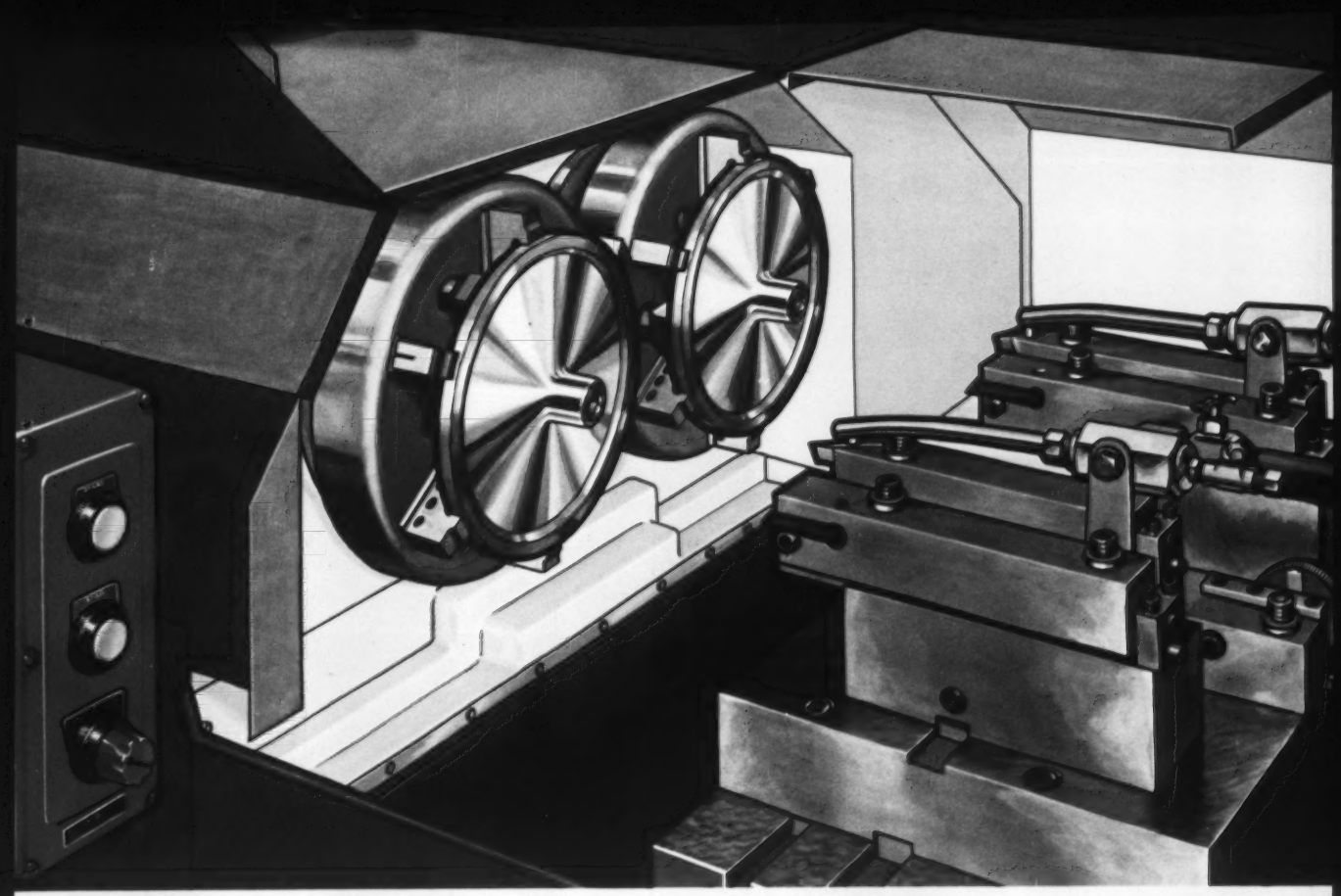

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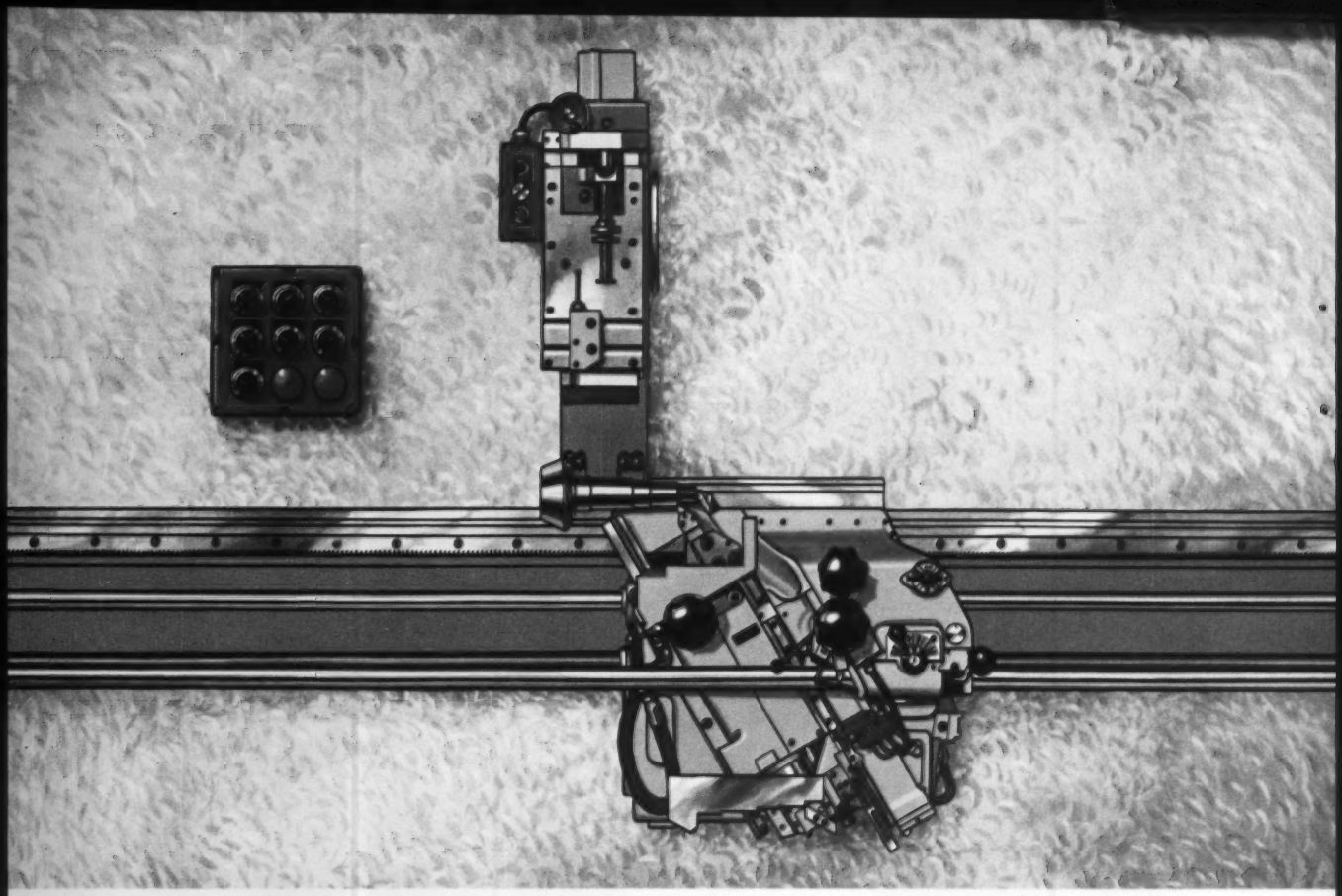

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Right from the ground up the New Britain **+GF+** is a machine conceived, designed and manufactured as a copying-contouring lathe. Not a standard lathe with copying attachment; not a factory-made "special" with the contouring feature built on components from other lathes; but a solidly based, ruggedly constructed, fast, powerful, accurate machine designed solely for the template-controlled, rapid production of between-centers or chucked work with external or internal contouring.

A million pieces or just a few, it's a machine you'll use on many different types of short-run jobs (just change the template and reset the controls), or on one long-run job (just replace the single-point tool when it wears).

The instantaneously accurate hydraulic copying mechanism is entirely enclosed within the compact carriage. All controls are within easy reach. The template is up front for easy adjustment. The chips fall free into the wide open base, can't clog or jam any part of the mechanism.

There are endless variations available within the New Britain **+GF+** line. The standard model has applications anywhere on between-centers or chucked pieces. Other attachments and models are available to suit your particular requirements; infeed attachments, automatic loading, bar stock models, etc.

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FREE LITERATURE

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Finishing Copper Plate

Information on abrasive finishing methods and materials for copper plate fills a data sheet. Material covered includes such data as buff speeds, type of buff, proper liquid or bar abrasive compound and working hints. Types of finish discussed include color, high color, satin and butler. (The Lea Mfg. Co.)

For free copy circle No. 12 on postcard

Drop Forgings

Presented in a 16-page illustrated brochure is an outline of diversified design, engineering and processing services. They are available in the production, machining, coining and finishing of ferrous forgings for the automotive, aircraft and farm-machinery industries. The brochure includes case histories, step-by-step production illustrations and information on improved techniques and cost-cutting engineering approaches in product development. (Union Forging Co.)

For free copy circle No. 13 on postcard

Drill-Press Feeds

Eight pages in length, a catalog illustrates, describes, and gives detailed specifications on a line of drill-press feeds and tapping and drilling machines. (Beckett-Harcum Co.)

For free copy circle No. 14 on postcard

Idler

A belt conveyor idler is described in a 20-page bulletin. The idler consists of a series of neoprene discs molded to a neoprene-covered, flexible-steel-wire cable suspended from two end-mounted bearings. The bulletin contains complete specifications, a detailed description of construction features, installation photographs, application instructions, and an explanation of advantages. (Joy Mfg. Co.)

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Jaw Clamps

Information on all-purpose jaw clamps, which eliminate the use of U-clamps, straps and fingers, is available. The literature contains specifications, pictures, and diagrams of the all-purpose jaw clamps which secure work-pieces quickly and rigidly, and are easily adapted to box fixtures. (J&S Tool Co., Inc.)

For free copy circle No. 16 on postcard

Recessing Tool

A brochure relates information on a new automatic recessing tool. This tool cuts recesses to exact depth, width, and position in one operation. It will complete a recessing job in 3 to 7 seconds. (Madison Industries, Inc.)

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Die-Handling Trucks

Analyzing a line of industrial trucks for die handling, a six-page, illustrated folder contains full specifications for all company die-handling vehicles. They are available in capacities from 6000 lb to 120,000 lb. Platform specifications, truck heights, weight and turning space are charted. In addition, the colorful booklet shows the four basic types of trucks used in die-handling operations. (The Elwell-Parker Electric Co.)

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Anodes

Described and illustrated in a seven-page bulletin is a full line of anodes, anode accessories and chemicals for electroplating and metalfinishing. Specifications and recommended applications are given for several styles of anode bags, and seven types of anodes. The bulletin lists salts commonly used in electroplating baths and a

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FREE LITERATURE

number of brighteners used in the manufacturer's solutions. Anodes described include nickel, cadmium, brass and bronze, copper, lead and zinc. Various types of nickel anodes are listed along with recommended applications and pH ranges. (Hanson-Van Winkle-Munning Co.)

For free copy circle No. 19 on postcard

Laminated Plastics

An easy-to-use laminated-plastics selection guide combines a 12-page manual with a quick-reference chart of characteristics for 21 commonly-used laminate grades. The manual includes considerable handbook information for specifying and ordering laminated plastics. Included are: A thumbnail description of high-pressure laminates; the difference between minimum/maximum property values and average values; where and why laminate property values differ from the specification properties listed for metals. Composite laminates, made by bonding a compatible material to a laminated plastic, are also described. (Taylor Fibre Co.)

For free copy circle No. 20 on postcard

Furnaces

Describing a line of tubular element furnaces, a brief bulletin also details operating and control features. The furnaces are used for processing a wide variety of work at temperatures up to 3000°F. The bulletin also supplies several illustrations of air and controlled atmosphere models as well as dimension drawings and specifications. (Harper Electric Furnace Corp.)

For free copy circle No. 21 on postcard

Carbon Dioxide

Dealing with carbon dioxide and its value to industry, a 24-page booklet covers the history, principal applications, properties, manufacture, supply and distribution of carbon dioxide in gaseous, liquid and solid form. The booklet contains all the data necessary for readers to gain a clear understanding of how this versatile chemical can be used in industry today. Specialized regulating equipment and controls for carbon dioxide are also covered. (Pure Carbonic Co., Div. of Air Reduction Co., Inc.)

For free copy circle No. 22 on postcard

Speed Variator

Covered in an eight-page booklet is a description of a parmatic speed variator. The compact packaged adjustable speed dc motor drive operates from ac power. The speed variator is suitable for a wide variety of drive applications, including such industries as can, rubber, plastic, cement, glass, steel, metalworking, and others. (General Electric Co.)

For free copy circle No. 23 on postcard

Storage Equipment

Presented in an eight-page catalog is a line of phosphatized steel storage equipment. The two-color catalog describes and illustrates angle shelving, T-line shelving, steel lockers, book-case shelving, steel cabinets, wire-basket storage units and service-truck shelving. Photographs illustrate many different models of each of these types of storage equipment. Specifications covering design and construction details of the line are described and pictured. Tables list dimensions. (Alan Wood Steel Co.)

For free copy circle No. 24 on postcard

Balancing Machines

Two complete lines of static-dynamic balancing machines are described in 20-page bulletin. The bulletin describes a compensator and pivoted cradle machines, including special adaptations for jet engines and components, automobile engines and completely automatic balancing machines. In addition, the bulletin includes an informative dissertation on the nature, causes and correction of unbalance, with descriptions and schematic diagrams of four different balancing methods. (Tinius Olsen Testing Machine Co.)

For free copy circle No. 25 on postcard

"Very pleased with all the advantages offered by Tri-Lok. Always prefer shipments to be made in this form due to handling ease, safety and convenience."
NEW YORK SMELTER

"TRI-LOK ingots cut our unloading time quite a bit. They don't shift in bundles . . . but stay in place for easy storing and fork-lift handling."
MIDWEST ALUMINUM PRODUCTS MANUFACTURER

"ALCAN TRI-LOK ingots arrive compact and stay compact until we use them. They stack safely, stably—even three or four bundles high. And when straps are cut, they stay in place until fork-lift pickup."
CALIFORNIA EXTRUDER

"We're very enthusiastic about new ALCAN TRI-LOK ingots. Always liked Alcan ingot anyway . . . even more so with Tri-Lok. Mainly from point of view of stacking and handling."
EASTERN EXTRUDER

Despite the stability of TRI-LOK bundles, there's never a separation problem—*just lift to separate!*

Here are some typical examples of what users are saying about Aluminium's newest ingot development—ALCAN TRI-LOK ingot.

Designed for more efficient handling, the new ingots lock one to another, not in just one, but in three different ways. The resultant stability means greater speed, simplicity and safety wherever ingots are handled.

In car unloading, you find bundles arrive in excellent condition ready for quick pickup by fork lift truck. In-plant moves, too, are greatly simplified because no pallets or special slings are needed. Even after strap removal, TRI-LOK bundles remain securely intact on trucks, floors or inclined ramps.

See for yourself how TRI-LOK ingots improve worker safety . . . save time in carrying, storing and remelt charging. Just telephone or write us today.

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ALCAN

Ingot Specialist...serving American Aluminum Fabricators—

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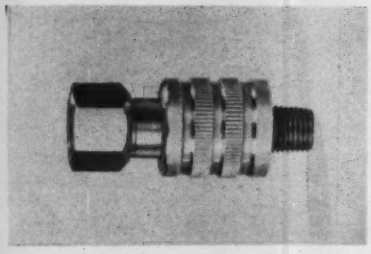
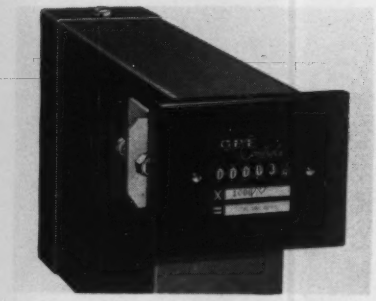
New Materials and Components



Corrosion-Resistant Materials Form New Valve

Compact in design, a 3-way, 2-position, air-control sleeve valve operates close to full capacity with little friction loss. This "on-off" valve can be used in every industrial plant where controlling, single - acting, spring - return cylinders automatically will speed production. Measuring 2¾ in. long and 1⅛ in. in diam, the valve installs quickly and easily in any position; and in any place on the production line. (Airmatic Valve, Inc.)

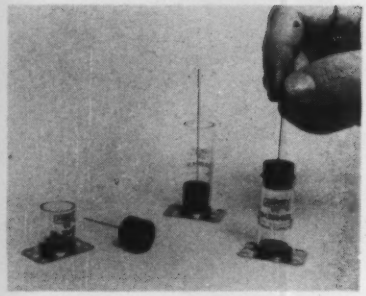
For more data circle No. 26 on postcard, p. 125



Instrument Integrates Flows, Other Quantities

Requiring only about 3 x 3½ in. of front panel space, an electric integrator integrates flows represented by a dc electrical signal. Although designed for use with the company's linear signal electric flow transmitters, the instrument can be used for integrating any quantity that can be linearly represented by a dc voltage or current signal in the 0-25 v range. This could include positive displacement fluid motors driving tachometers, lineal measurement of webs and strips. Integration is continuous and accurate to within ½ of 1 pct. (GPE Controls, Inc.)

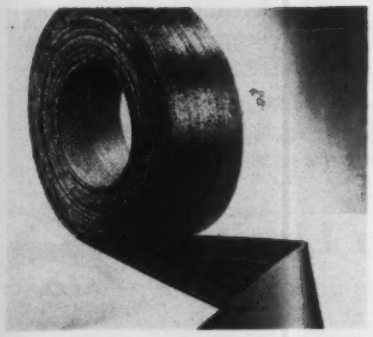
For more data circle No. 27 on postcard, p. 125



Dashpot Clears Up Important Control Problems

Weighing less than an ounce, an air-damping dashpot solves these three control problems: system stabilization, vibration damping and time delay. The unit is precisely constructed of a graphitized carbon piston and low-expansion glass cylinder. The standard dashpot provides equal damping in two directions. Other models are capable of one-way damping. In either case, damping is adjustable with a screwdriver or can be preset at the factory. Once set, calibration is maintained throughout millions of cycles under adverse conditions. (Electric Regulator Corp.)

For more data circle No. 28 on postcard, p. 125



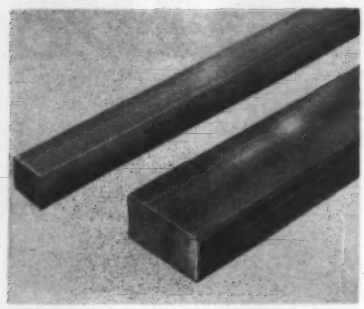
Conveyor Belt Offers Heat Resistance

A heat - resistant conveyor - belt can handle materials up to the extreme temperature range of 1100°F. The belting is made from 7 to 12 plies of specially-treated asbestos and cotton, which is heavily stitched with heat-resistant twine; and double stitched along the edges to prevent curling. The service side of the belting is coated with a heat-resistant compound formula. The belting remains completely flexible throughout its service life, and is easy to maintain. It promises to open an entirely new field in the reduction of plant overhead and operating expense. (The Hettrick Mfg. Co.)

For more data circle No. 29 on postcard, p. 125

Aluminum Bronze

An extruded aluminum - bronze material, used in applications as wear strips, wear plates, strike plates and lathe beds, comes in many sizes. A few of the sizes are: ¾ by 1 in.

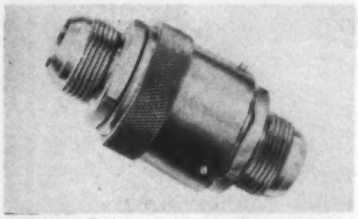


in Alloy 4-11 and ⅜ by ½ in. in Alloy 4-13. Altogether there are 97 stock sizes available, excluding custom-made shapes. (Meier Brass & Aluminum Co.)

For more data circle No. 30 on postcard, p. 125

Self-Sealing Coupling

For use in aircraft fuel, oil, low pressure hydraulic, pneumatic, and other systems, a self-sealing coupling insures positive connection. The coupling provides fast, safe connections in applications where positive foolproof locking is required. Hence, there is no stable, partially-connected position per-



mitting fluid to flow. In addition there are three check points used to verify positive connection—sound (an audible click action); visual (indicator pins protrude externally when coupling is locked); touch (position of indicator pin can be determined manually). (Aeroquip Corp.)

For more data circle No. 31 on postcard, p. 125

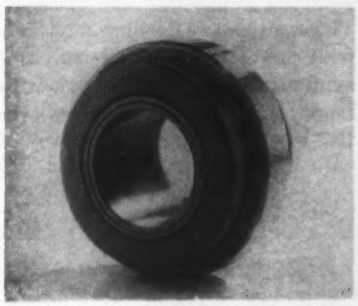
Synthetic Oil

Designed for extreme, low-temperature applications such as chart drives, clock movements, meterological and aircraft instruments, a light-viscosity, diester oil features a pour point of below 105°F. Combined with good oxidation stability and exceedingly low evaporation, a superior lubricant is produced that meets the requirements of low starting and running torques over a temperature range of 100° to 250°F. Completely compatible with ordinary lubricants, the synthetic oil offers penetration comparable to the finest penetrating oils. It is also free of water, and a film protects parts from humid or salt conditions. (Lehigh Chemical Co.)

For more data circle No. 32 on postcard, p. 125

Bearings

Combining the design advantages of sleeve and ball bearings, a line of bearings features interchangeability with ball bearings in bore and shaft requirements. Features of the new bearing include: a base life of 20,000 hours, a lifetime recirculatory oiling system, and a hydrodynamic oil film between inner

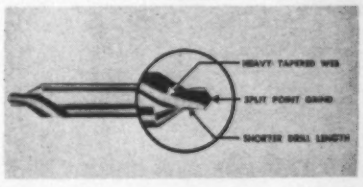


race and bushing which supports the weight of the shaft. There is no metal-to-metal contact at any point. The bearing is virtually vibration-free and noise-free, is resistant to humid and gritty atmospheres, and does not leak oil. Recommended operating temperatures range from −25° to +200°F. (Tann Corp.)

For more data circle No. 33 on postcard, p. 125

Drill and Countersinks

Heavy-duty combined drill and countersinks have design features that contribute substantially to their efficiency and economy in opera-



"the HITCHINER way..."

...and non-machinable super alloys in INVESTMENT CASTING

These spray nozzles for highway striping paint sprayers were formerly machined out of cold rolled bar stock. When ordinary paint was used, these nozzles functioned satisfactorily. However, when ground glass was added to the paint for reflecting purposes excessive wear caused frequent replacement.

By "the HITCHINER way . . .", we were able to engineer the manufacture of this part by investment casting in a non-machinable type alloy exhibiting a very high degree of resistance to both wear and corrosion.

This change of alloy, which eliminated the need for frequent nozzle replacement, was made possible through investment casting because the required close dimensional tolerances and detail could be cast to size.

Through the wide freedom of choice in alloy, as well as through flexibility in design and the elimination of expensive machining operations, investment casting may possibly solve your metal parts manufacturing problems. Send us your sample or blueprint and find out with a Hitchiner "engineered quotation" — no obligation.

Find out how our new ceramic shell technique can possibly benefit you. Send for our free, new revised brochure on the latest investment casting methods.

HITCHINER
MANUFACTURING COMPANY INC.
MILFORD 30, NEW HAMPSHIRE

Coast to Coast Engineering Representatives

MODERN MACHINE TOOLS
MMT=PE
PRODUCTION EFFICIENCY

See multicycle hobbing at 1960 Machine Tool Exposition... Booth No. 923.

Here is one of the most promising machine tool developments for general-purpose gear cutting in the history of modern hobbing.

61%

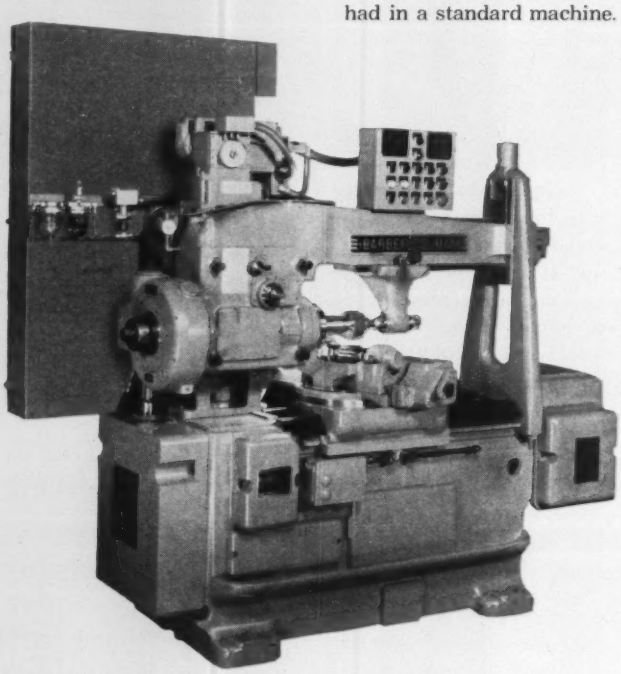
...on New

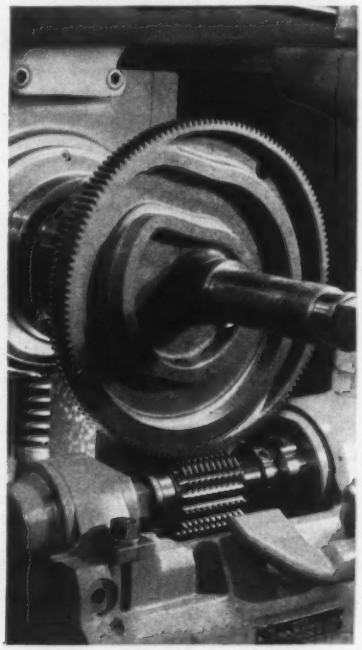
Now, faster production through reduced cutting time and easier setup is a practical reality for a wide range of work. Barber-Colman's new No. 16-16 multicycle machine reduces nonproductive machine time greatly. Job studies noted on the opposite page are typical of what you can expect without a change in material specifications or hob life. Annual savings for the full range of work produced on this machine would show a significant increase in profits.

Hobbing worm gears, splines, helical gears, or spur gears—in 1- or 100-piece lots—you can trim valuable minutes from cycle time without sacrificing finish or hob life. The larger the hob, the more time you save—because nonproductive approach usually can be reduced considerably with the plunge-approach cycle.

This is automatic hobbing at its best, with power vertical feed and conventional horizontal feed—also with more real versatility than you ever had in a standard machine. Any of three automatic cycles can be chosen by turning a switch.

1. *Square cycle*—automatic version of conventional hobbing cycle, with rapid positioning of workslide and rapid return of the hob carriage.
2. *Plunge cycle*—automatic vertical feed, with infinitely variable downfeed and rapid positioning of the workslide.
3. *Plunge-approach cycle*—combination of the above to provide shortest possible approach to full depth.





MORE GEARS

Multicycle Hobbing Machine

Once setup is completed, the operator loads, presses the start button, and unloads manually. The big difference is in the way the hob and work are positioned—faster, accurately, automatically, and in the most direct manner.

In reviewing these possibilities for your plant, consider the added advantage of variable downfeed. A worm gear job formerly was done on a conventional machine. With a feed rate of .007″ per revolution, followed by a four-revolution dwell, and with a hob speed of 103 rpm, floor-to-floor time was 4.83 minutes.

The same job on the multicycle is done in 3 minutes, floor to floor. Setup time has been reduced from 67 minutes to 55 minutes.

Part of this saving results from constantly variable vertical feed. This provides a high feed rate at the start of the cycle when chip load is light . . . light feed at full depth when chip load is heavy. The *average* feed of .018″ per revolution is more than double that used on the change-gear-type machine.

Multicycle machines are now in production in both the Nos. 6-10 and 16-16 sizes. Call your Barber-Colman field representative or write the factory for delivery information.

Barber-Colman Company

BARBER COLMAN

610 Loomis Street, Rockford, Illinois

TYPICAL SAVINGS WITH MULTICYCLE HOBBING

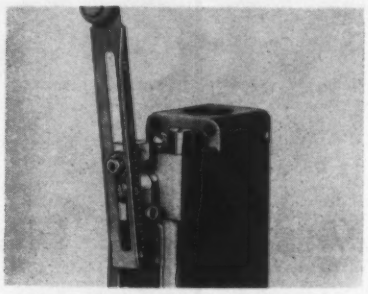
JOB FACTS	Cast Bronze Worm Gear		Cast Iron Spur Gear (shown at left)	
	Conventional (Vertical Feed)	Multicycle (Variable Feed)	Conventional	Multicycle (Plunge Approach)
Hob speed (rpm)	103	120	246	246
Horizontal feed (ipr)	....	....	.060	.060
Vertical feed (ipr)	.007	.018 (average)	....	.030
Approach Distance (in)	....	....	.700	.360
Dwell	4 rev.	24 seconds	....	....
Pieces per hour	12.42	20	6.94	8.68
Setup time (min.)	67	55	85	85
Production increase		61%		25%

tion. The heavy tapered web and shorter drill length add the extra strength to the dull section that minimizes point breakage. With the split point grind, the drill point begins cutting immediately on contact with the work. The drill will not crawl or wander when feed pressure is built up, resulting in greater accuracy in location of center hole. Considerably less thrust pressure is required to penetrate the work. (Q-T Tool Co.)

For more data circle No. 34 on postcard, p. 125

Limit Switch

Roller arms have been developed which can be adjusted to any length between 1 and 4 in. The arms are available for use on the company's limit switches. The arm length can be changed by merely loosening an Allen head screw and sliding the arm up or down to the desired position. A scale on the side of the arm is clearly marked in ⅛-in. increments for easy adjustment. The roller can be turned to the inside or the outside of the arm for varied

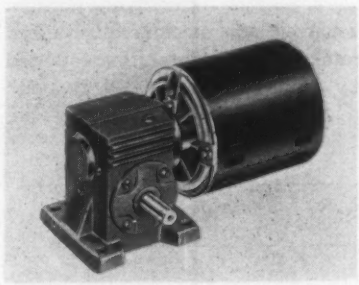


cam track locations. Roller diameters of ⅝ and 1 in. are available. (Square D Co.)

For more data circle No. 35 on postcard, p. 125

Speed Reducer

Compact assembly for space-saving design is featured in a newly-developed speed reducer. The horizontal, right-angle drive is powered by specially designed 1/20-hp or 0.035-hp motors. It provides a full



range of output speeds from 43.8 to 350 rpm. A simple, standard mounting bracket permits easy mounting in many positions without mechanical alteration. (Boston Gear Works)

For more data circle No. 36 on postcard, p. 125

Tapping Attachment

For use on any drill press, a tapping attachment makes tapping practical in any material and at any diameter from 0 through ½ in. The unit works equally well on tool steel, mild steels, and nonferrous materials. The principle advantage of the new unit is its unusual versatility, particularly for small shops. It can be installed on a drill press in less than a minute's time. After the tapping is completed, the attachment can be removed just as

GOLD STAR SR

This d-c rectifier type welder does more things better than any other welder of its class because —

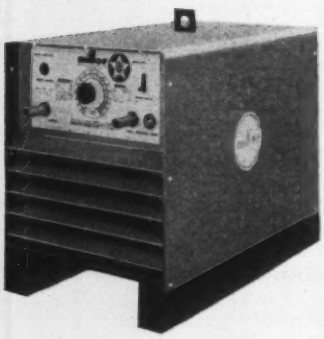
a. Its new transformer (Miller designed and built) has integral flux diverter.
b. Its new weld stabilized circuit delivers the ultimate in speed of metal deposition.
c. Its new completely sealed semi-metallic rectifier — designed for welding — provides the most efficient d-c for welding ever devised.

These features contribute to the Gold Star SR's greater arc stability, denser welds, easy arc starting and flexibility to handle all electrodes in all positions.

Performance-proved wherever profits are important, the Gold Star SR is available in single and duplex models of 200 to 1200 amperes at 60% duty cycle ratings.

miller WELDERS

GOLD STAR
All-Weather
SRH



The features that set the SR above and beyond the normal standards of welder performance belong to the SRH also. But, in addition to the horizontal design for easier stacking and paralleling, this welder has an "all-weather" construction that includes baked varnish coated transformers and rectifiers plus phosphatizing and painting of all base and sheet metal — even fan blades. Cam-Lok receptacles are standard equipment. The Gold Star SRH welds real well.

Complete specifications on these Gold Star models will be sent promptly.

miller ELECTRIC MANUFACTURING COMPANY, INC., APPLETON, WISCONSIN

• Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal

quickly. This permits the mechanic to use a drill press for all its regular work and switch it over to tapping when necessary. (Supreme Products Corp.)

For more data circle No. 37 on postcard, p. 125

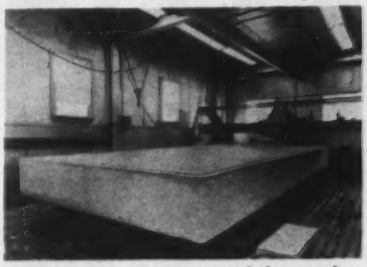
Draw Valve

Capable of drawing water from bottom of storage tanks, a valve has two seats or valves mounted on the same stem. The inner valve seats first. This permits the chamber between the inner and outer valves to drain before the outer valve is closed. The valve permits the operator to flush any foreign particles that might cause leakage off the seat of the inner valve. The cap on the end of the valve body, and the outer valve can be removed, and the seat on the outer valve replaced, while the inner valve remains closed against the tank products. This permits the valve to be serviced without the expense and inconvenience of emptying the tank. (The Johnston & Jennings Co.)

For more data circle No. 38 on postcard, p. 125

Surface Plates

Oversize granite surface plates, for precision measurement of large parts, meet the needs of heavy machinery and equipment manufacturers requiring accurate and extensive reference surfaces. Constructed entirely in one piece, they eliminate the problems often encountered in lining up several small surface plates to create one large reference surface. They are manufactured with an automatically con-



trolled finishing machine that propels large lapping plates to smooth and polish the final surface. This improved finishing method produces a uniform over-all ac-

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When you need machine work or specially built machinery of any kind, you'll find Sun Ship qualified to do the job exactly to your specifications. We have machine tools of every size, and the facilities and skills born of long experience.

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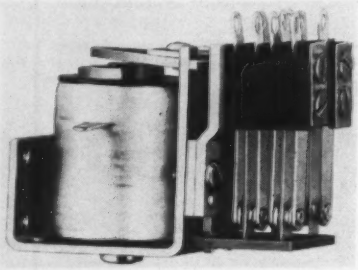
333 William Street • South River, New Jersey

curacy and eliminates the waves that can result from hand finishing with small lapping plates. A complete range of surface plate sizes is available up to 50-ft long. (The Herman Stone Co.)

For more data circle No. 39 on postcard, p. 125

Telephone-Type Relay

A medium-power telephone-type relay is available with contact arrangements up to four-pole double throw; in voltages from 6 to 220 v ac and dc. The contacts are made of fine silver and gold flashed, and are rated at 5 amp. Applications include: communications



equipment, computers, industrial programming devices and many other applications requiring a small fast acting multi-contact relay. (Line Electric Co.)

For more data circle No. 40 on postcard, p. 125

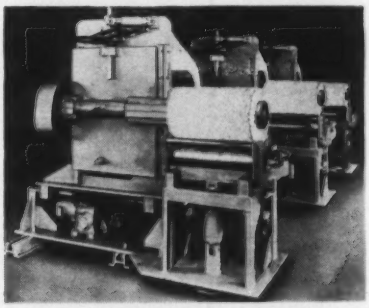
Tool Bit Grinding

A low-cost, patented tool permits grinding of tool bits on any surface grinder. It grinds them to any shape, angle or accuracy at savings up to 500 pct. Form tools, step tools, internal- and external-threading tools, including Acme, offset boring bars, can now be ground or sharpened in one setting. (Dern Tool Co.)

For more data circle No. 41 on postcard, p. 125

Wheel Head

Specially designed for continuous buffing of aluminum, brass, or steel coil stock, a wide-faced wheel head may be placed in tandem and angularly positioned for cross-cutting action. The complete head oscillates, allowing more uniform buffing. A special jog automatic wheel positioner is provided to compensate for buffing wheel wear. A billy roll supports the strip at the buffing point. When stitched or welded coil ends pass under the

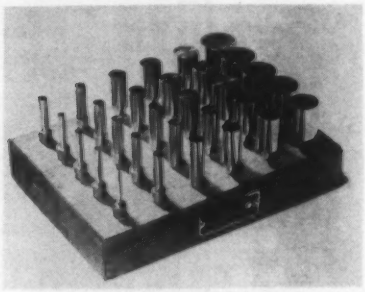


buffing head, the billy roll automatically drops out, allowing the strip to run free. (Murray-Way Corp.)

For more data circle No. 42 on postcard, p. 125

Tracer Stylus Sets

For use with 360° and 3-d duplicating, tracer stylus sets are available with round nose for ball end mill work or square nose for flat



end mills. Each set contains 30 stylii, and is packed in a hardwood case. Stylii are hard chrome plated. (Tru-Trace Corp.)

For more data circle No. 43 on postcard, p. 125

Engines and Pumps

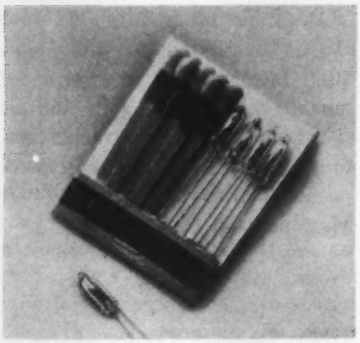
Developed from units designed for undersea warfare and other national defense purposes, a new family of swash-plate engines and high-pressure pumps is available for general application. Engines are characterized by high performance, compactness, ease of maintenance and reliability. They are available with shaft horsepower ratings from 1 to 100 or more. They deliver constant torque from stall to full speed. Pumps are available in wet and dry swash-plate design. Wet swash-plate models are suited to

pumping a variety of non-corrosive liquids, including low-lubricity problem fluids. Dry swash-plate units are designed for pumping corrosive compounds such as nitric acid, hydrogen peroxide and hydrazine. (Clevite Corp.)

For more data circle No. 44 on postcard, p. 125

Mercury Switch

With specifications of ½ in. maximum length, 0.162 in. diam, and 1/10 amp rating, a small mercury switch proves to be durable. Although it was initially developed as a reversing switch for a portable electric device motor clutch, the miniature switch is ideally suited for such applications as miniature on-off switch, paging devices, hearing aid switch, switching requiring slight force, or applications that



have a low load, light weight or space factor. Switching action is single pole single throw. Differential angle is 15°; ac load at 115 v and 230 v is 0.1 amp; dc load at 115 v and 230 v is 0.1 amp. Lamp load is 10 w. Locked rotor rating: ac inrush at 115 v is 1 amp, at 230 v is 0.5 amp; dc inrush at 115 v is 1 amp, at 230 v is 0.5 amp. (The Gordos Corp.)

For more data circle No. 45 on postcard, p. 125

Canned Pump

A sealless pump, with an externally-mounted heat exchanger for high-temperature operation, has been developed by means of canned construction. The pump and motor are one. There are no stuffing boxes or seals and leakage is completely eliminated. The unit is very useful when handling explosives or toxic liquids. (Fostoria Corp.)

For more data circle No. 46 on postcard, p. 125

DETAIL FLANGE PUNCH
Speeds single hole flange punching; eliminates end-for-end turning of beams. Punches 1¼" hole through 1" mild steel. 100-ton capacity.
GAP TYPE PRESS
For forming, bending, flanging, pressing. 250-ton capacity.
GUILLOTINE BAR SHEAR
For production or short run shearing of rounds, squares, angles and bars without changing tools. 43 to 300 ton capacities.
GUILLOTINE BEAM PUNCH
For punching flanges and webs of I-beams from 6 to 30 inches. Large die space; clear working space. 200-ton capacity.
GUILLOTINE BEAM FLANGE PUNCH
Speeds flange punching of beams. Built-in adjustable tools save set-up time. Four punching units. 200-ton capacity.

Tool Up With BEATTY *For Efficient Low Cost Metal Working*

Savings in metal working start with Beatty machines . . . job-engineered equipment that is especially designed to speed work flow and provide dependable, accurate performance — on the production line or on short run jobs or repair work. Beatty machines are built rugged and rigid to give more low-cost, maintenance-free production per man-hour; earn more profits per square foot of floor space and dollar investment.

WRITE FOR FREE DESCRIPTIVE LITERATURE on some of the BEATTY LINE of metal working equipment: Shears, Punches, Presses, Spacing Tables, Bulldozers, Stamping Trimmers

BEATTY MACHINE & MFG. CO.

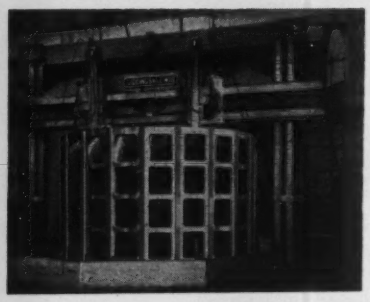
936 150th Street, Hammond, Indiana

New Equipment and Machinery

Mobile Tester Offers Ruggedness and Accuracy

Consisting of a clamping device and an indenter head, a mobile hardness tester conducts Rockwell hardness tests on large or bulky metal components and work specimens that must be tested in position. Also utilized in tool departments, and maintenance repair shops, the lightweight tester is available with various clamping designs to insure accurate and easy application for all test conditions. (American Chain & Cable Co., Inc.)

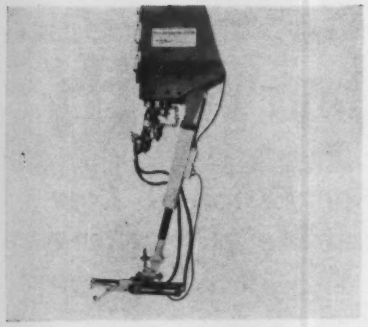
For more data circle No. 47 on postcard, p. 125



Boring Mill Features Control in Pendent Station

Workpieces in a wide range of sizes can be machined efficiently on a 100-hp vertical boring mill with 20-ft swing. The machine comes with a 12-ft diam table over which is fitted a 16-ft diam table for machining large workpieces. The larger table can be removed so that smaller work can be handled on the 12-ft table. Table loads up to 75 tons can be accommodated with ample safety factor. The table drive speed range is 0.26 to 22.5 rpm. Shifting is accomplished by hydraulic pressure controlled electrically from the pendent station. (Giddings & Lewis Machine Tool Co.)

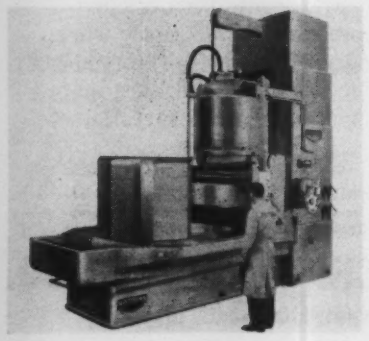
For more data circle No. 48 on postcard, p. 125



Press Unloader Provides High-Speed Operation

For removing stampings from presses, a swinging arm-type unloader attaches to the crown of a press. Controlled by the press, it will operate at speeds up to 40 strokes per minute, with 45-psi airline pressure. The swinging arm provides a vertical lift for the stamping with a smooth, non-dipping unloading stroke. The operating linkage mechanism eliminates the use of cams and oil-cylinder cushioning. It is controlled by a small diameter JIC air cylinder. Maintenance for the swinging arm is at a minimum because the self-enclosed frame has adjustable hardened gibs and long-life roller bearings. (Press Automation Systems, Inc.)

For more data circle No. 49 on postcard, p. 125



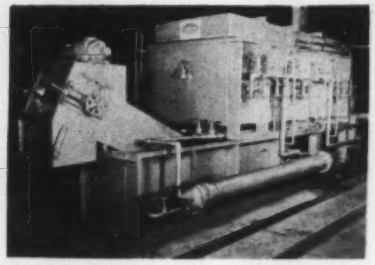
Rotary Surface Grinder Has Quick-Tilt Spindle

Extra-large pieceparts can be rough and finish ground in a single operation on a vertical, rotary surface grinder. The grinder has a 60- to 72-in. magnetic chuck. The machine has enough mass to apply 125 hp through the spindle. The tilted wheel rough grinds to within "thousandths" of final size. A flip of the selector switch returns wheel to dead flat position in seconds for finish grind. Precision tolerances and cross-grind finish are economically feasible on every job. Downfeed is continuous from 0.005 to 0.165 ipm. Controls are centralized on an adjustable pendant which rides on a bar on the column. (Mattison Machine Works)

For more data circle No. 50 on postcard, p. 125

Hearth Furnace

Designed for automatic, continuous atmosphere heat treating and quenching, this furnace can be used for hardening and carbonitriding within an operating range of 1400° to 1800°F. Especially



adaptable to processing small parts such as fasteners, nails and bearing parts, it can be built in a range of sizes which will process from 50 to 1200 pounds per hour. (Sunbeam Equipment Corp.)

For more data circle No. 51 on postcard, p. 125

Soldering Iron

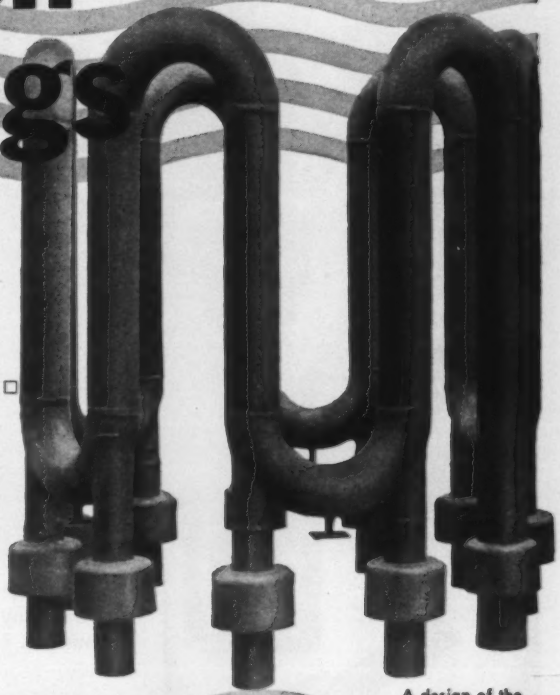
Development of a new 8-oz, 10-w ultrasonic soldering iron, makes possible the soldering of a wide range of materials without flux. The new low-cost ultrasonic iron is ideal for soldering semiconductor materials, as well as metals such as aluminum, magnesium and their alloys; especially those characterized by very rapid surface oxidation. The new unit completely eliminates surface pretreatment as well as post-cleaning to remove flux. The unit operates on normal 115-v, 60-cycle power. (Gulton Industries, Inc.)

For more data circle No. 52 on postcard, p. 125

Selection Kit

A honing stone selection kit facilitates rapid selection of the most suitable stone for bore sizing and finishing requirements in the ⅛- to 2-⅝-in. diam range. The kit covers all honing needs encountered in everyday shop work. Supplied in a steel cabinet with sturdy plastic drawers, assortment provides 224 stones in 72 varieties of abrasives and stone sizes, for deburring, stock removal and finishing operations. Selection guides, on drawer fronts,

when things are HOT... call on Duraloy



A design of the A. F. Holden Co. Detroit, Mich.

Castings that Keep their Load-Carrying Strength at High Temperatures

This "immersion type radiant heater" is typical of the high reliability castings turned out by DURALOY. Centrifugally cast tubes with *UNIFORM* wall thickness...for longest service life. Static cast collars and shell molded bends...typical of DURALOY versatility.

For your high alloy casting requirements check with DURALOY... our long experience, ultra-modern foundry and up-to-the-minute test equipment will be helpful in solving your problems. For more information ask for Bulletin No. 3150 G.

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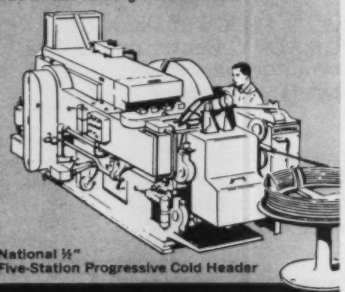
These important parts are cold-formed from coiled wire, start to finish in compact, efficient National Cold Headers.

Three are formed with no scrap loss. Two are ready to use! All five achieve remarkable savings over past methods.

If you make odd-shaped parts, may we help you evaluate them for cold-forming from wire? Better yet, come to Tiffin, witness our demonstrations and let's discuss your work.



National ½"
Five-Station Progressive Cold Header

NATIONAL MACHINERY CO.

TIFFIN, OHIO, U.S.A.

HARTFORD DETROIT CHICAGO

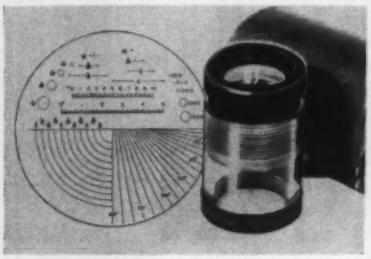
NEW EQUIPMENT

identify contents and aid in choice of right stone for each job. In addition, all stones are code numbered for positive identification. (Sunnen Products Co.)

For more data circle No. 53 on postcard, p. 125

Pocket Comparator

For measuring and analyzing jobs, a pocket comparator has full six-power magnification and an etched-glass reticle. With these, it is possible to do on-the-spot checking of linear dimensions, radii and angles, surfaces and small holes in parts

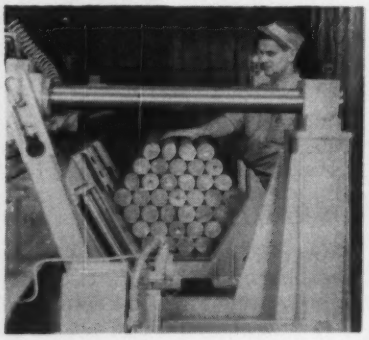


and castings. Some of the instrument's many uses are: checking fine layouts in tool and die work; accurate production inspection of metal stampings and machined parts. The comparator measures 2 x 2¼ in. (Edmund Scientific Co.)

For more data circle No. 54 on postcard, p. 125

Bundling Machine

Fully automatic, a bundling machine packages a wide range of piercing billets, extrusion billets and wire bars into uniformly-shaped, tight bundles. Two machines in tan-



dem handle both round billets up to 5-in. diam. and wire bars up to 4-in. square, in lengths up to 72 in. The round billets are bundled in a hexagonal pattern, while the square wire bars are stacked in a

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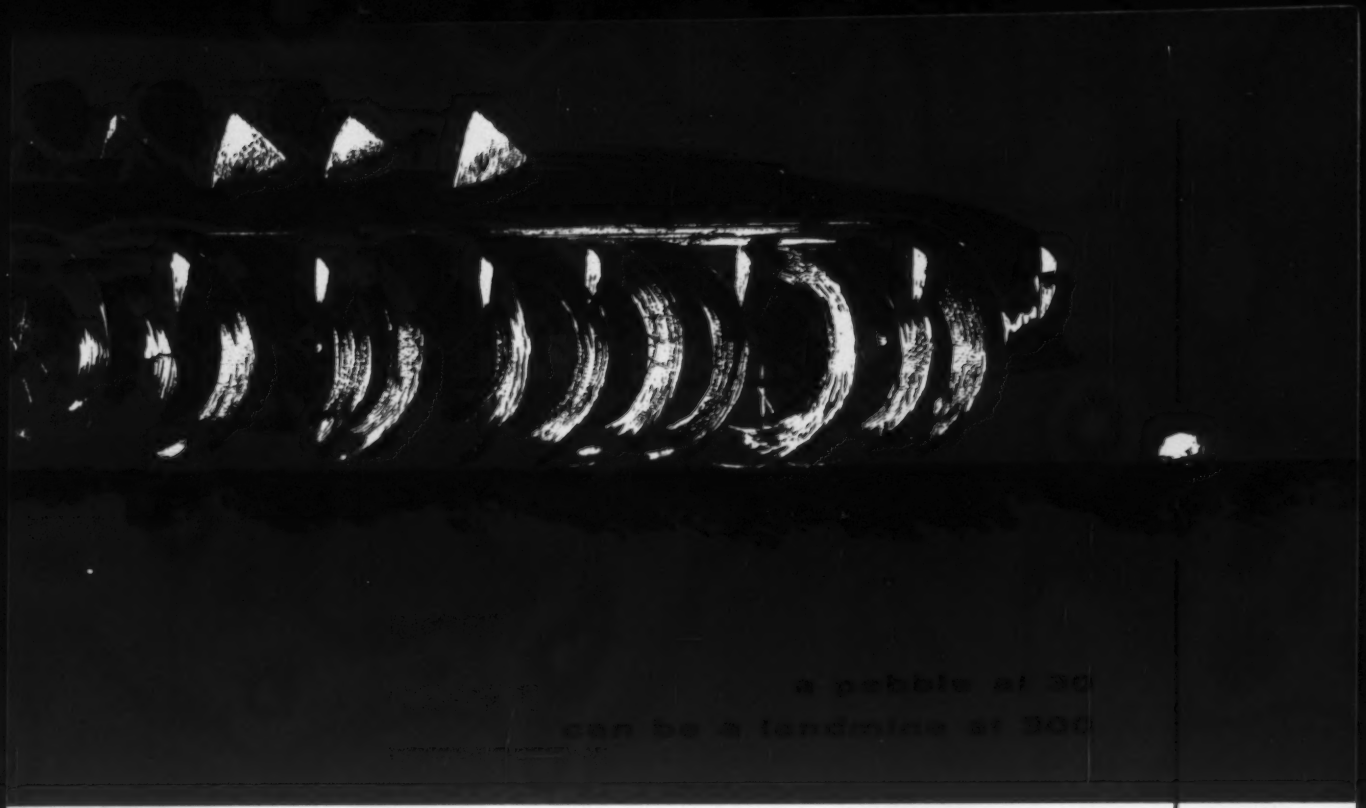

a pebble at 30
can be a landmine at 300

the harder you drive for
super speed production
the more you need safe-
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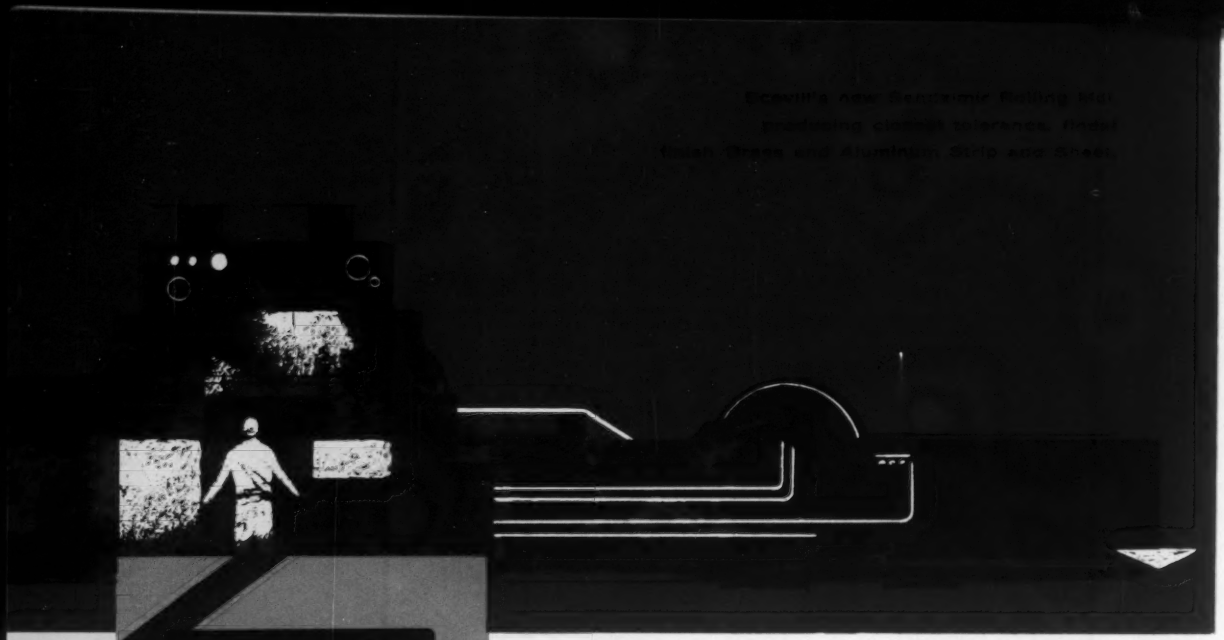
3SC60



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high speed
methods and
machines

Metal soundness and uniformity — For more than 20 years, unique Scovill *continuous casting* machines have been supplying a major part of the cast brass bars and billets used to produce strip, sheet, rod, wire and tube . . . over two billion pounds of metal that is inherently sounder and more uniform in every respect. This means fast running capability, minimum down-time and rejects, better quality products.

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Any fabricator who has made Scovill a part of his competitive team knows that these are only a few examples of the down-to-earth help and service he can depend upon. Call in Scovill NOW . . . especially if you want to get ideas and help in selection of the BEST metal for an important new product.

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. . . and made better to bring out the ***BEST*** *in your products*

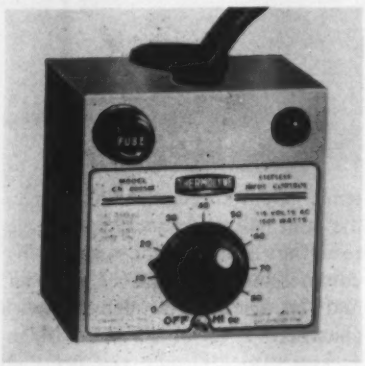
4SC60

square arrangement. The provision of two machines in tandem allows one bundle to be strapped, either manually or by power strappers, and discharged, while the next bundle is being built up in the other machine. A powered roller conveyor feeds the billets to the bundling machine from such prior operations as casting, sawing, cupping, scalping or inspection. The individual billets are picked up by a lifter and are moved by loading levers into a transfer arm. (Loma Machine Mfg. Co. Inc.)

For more data circle No. 55 on postcard, p. 125

Power Controller

Electro-thermally-actuated, a stepless power input controller can be used to control flash heaters, mantles, heating tapes, water baths, small furnaces and other equipment. This compact instrument is truly stepless. The user can set any percentage of time on, from 5 to 100 pct. A neon pilot light turns on and off as the power is cycled.



This unit automatically compensates for wide variations in voltage and ambient temperature. The corrosion-resistant stainless steel case incorporates a fuse to protect connected equipment and a female receptacle that accepts either a two- or three-prong plug. The circuit is rated at 115 v ac, 1500 w. (Thermo Electric Co.)

For more data circle No. 56 on postcard, p. 125

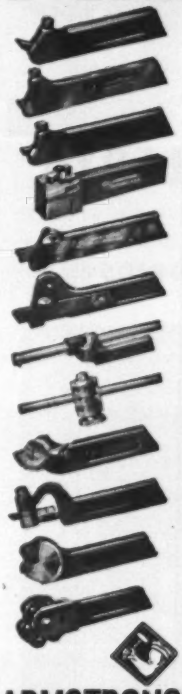
Piping and Tubing

Corrosion-resistant pipe and tubing is designed for high-temperature,

ARMSTRONG

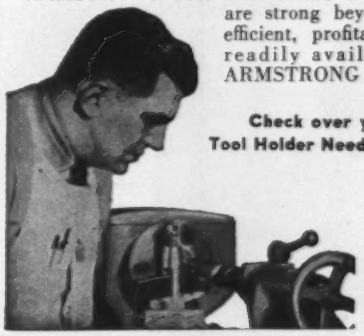
TOOL HOLDERS

A Correct Tool for Every Lathe Operation



You can save time (and money) by ensuring that your machine tools are equipped with *adequate numbers* of the correct ARMSTRONG Tool Holders. The ARMSTRONG System of Tool Holders includes correctly designed tools for *every* standard operation on lathes, shapers, and planers, and for many operations on turret lathes and screw machines. By utilizing the ARMSTRONG System of Tool Holders, you can reduce tooling costs, eliminate down time in tooling up, operate your machine tools at maximum feeds and speeds.

ARMSTRONG Tool Holders are long-lasting tools. They are strong beyond need, handy and efficient, profitable to use, and are readily available from your local ARMSTRONG distributor.



Check over your ARMSTRONG Tool Holder Needs. Write for literature.

If you do not know the name of your local ARMSTRONG Distributor, inquire when asking for literature.

ARMSTRONG BROS. TOOL CO. 5209 W. ARMSTRONG AVE. CHICAGO 46, ILL.

FOR SEGMENT OR CIRCLE BENDING OF ANGLES

THE TREND IS TO THOMAS

Thomas Angle Rolls will handle angles up to 6 x 6 x 7/8"

Thomas Angle Benders are of all steel construction and come in two styles and four sizes. Standard rolls permit "leg in" and "leg out" bending of angles. The machines may be converted for bending flats, rounds, squares, beams, channels, pipe and other shapes.

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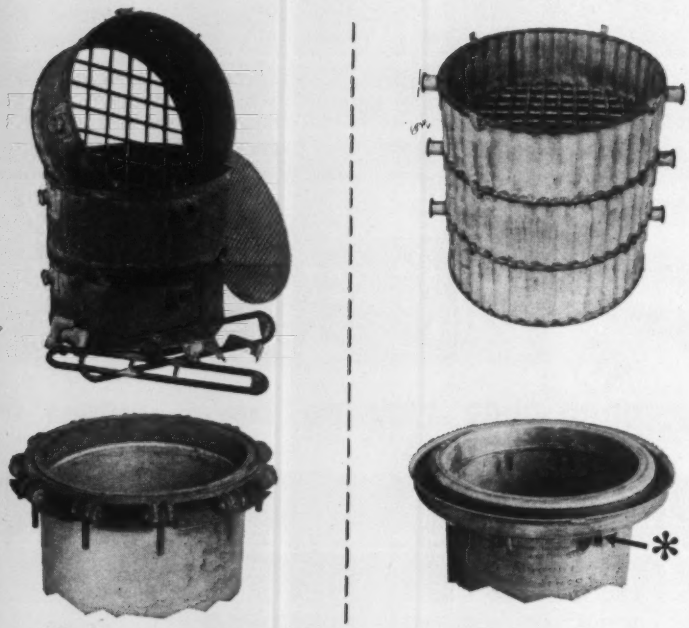

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JOB-ENGINEERED for better work
Easier Operation, Lower Cost

3RL59

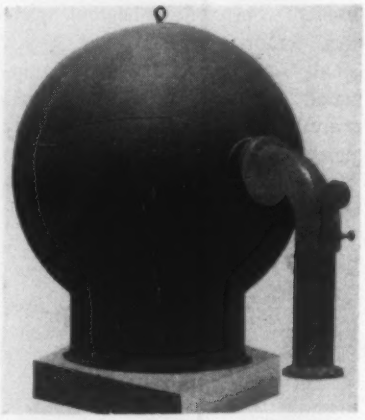
NEW EQUIPMENT

high-pressure, and corrosive applications. Through the cold rock-forging process, the weld is completely wrought. The pipe and tubing is available in sizes from 2½-4 in. (Swepco Tube Corp.)

For more data circle No. 57 on postcard, p. 125

Shock Trap

Of the water-gas interface type, a spherical shock trap utilizes the swirl principle and reduces pressure surge and eliminates water hammer and pipeline bursting. Designed primarily for water application, the new unit is being installed in pumping plants, irrigation systems, fire control on rocket test stands, and municipal water systems. Guaranteed not to recycle, the unit absorbs shock and surge resulting from kinetic energy by compressing gas within the chamber and by friction through a swirl chamber. It is built for design pressures to 200 psig and up, and sizes range from 34 to 102 in. in diameter. (Pulsation Controls Corp)



For more data circle No. 58 on postcard, p. 125

Air Compressors

A line of higher-capacity, heavy-duty portable air compressors includes six portable units and a stationary unit. The portable units are equipped with gasoline 8-hp engines. The compressor is a two-cylinder, single-stage, pressure-lubricated model equipped with constant-speed unloader, safety valve, pressure gauge, drain, and

two shut-off valves. The compressor on all the units is built especially for hard use and low maintenance. Operation on the stationary unit is automatic—a pressure switch maintains tank pressure to preset limits, so that the compressor is started and stopped automatically, based on air demand. (Binks Mfg. Co.)

For more data circle No. 59 on postcard, p. 125

Precision Welder

Designed especially for welding ultra-thin wires and foils, a new welder delivers an adjustable range of power of 0.01 to 10 watt-seconds in less than 0.001 of a second. With automatic voltage regulation,

repeatable power, even with line voltage fluctuation of ±20 pct, is attained. The small, compact welder may be used in resistance welding of the finest wire and materials produced. (Hughes Aircraft Co.)

For more data circle No. 60 on postcard, p. 125

Refractory Brick

For continuous service at operating temperatures up to 2600°F or more, in metallurgical and ceramic furnaces, a semi-silica refractory brick contains about 75 pct silica. Principal applications are in roofs of hot-metal mixers; roofs and sidewalls of heating furnaces; sidewalls of openhearth regenerators; blast-furnace stove domes and sidewalls; soaking-pit sidewalls and roofs; and in ceramic tunnel and periodic kilns. Outstanding features are: unusual volume stability and load bearing ability at top operating temperatures, and excellent resistance to structural spalling. In the presence of alkali vapors, a protective glaze forms on the hot face of

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WELDER'S GLOVES
SERVES THE SAME PURPOSE AS LEATHER GLOVES COSTING THREE TIMES AS MUCH!
Hundreds of very closely knitted loops per square inch prolong wear . . . offer flame and heat protection . . . increase manual dexterity. Perspiration will not harden or stiffen it.
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SAVE TIME AND MONEY
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Capacity to 6 inch plate cold
The LARGEST ever built
Our Line
Light and heavy machinery for all classes of sheet metal, plate and structural work
BERTSCH & COMPANY, CAMBRIDGE CITY • INDIANA

the brick which prevents penetration of furnace gases into the refractory brick and resultant damage. (H. K. Porter Co., Inc.)

For more data circle No. 61 on postcard, p. 125

Non-Fuming Cleaner

A water-soluble, liquid chemical safely and effectively removes grease, oil, gum, carbon, wax, ink, dye and other soils from all metals, plastics, concrete, glass and other porous and non-porous surfaces. The liquid chemical contains an inhibitor to prevent corrosion on ferrous and aluminum surfaces. (The Elgene Co.)

For more data circle No. 62 on postcard, p. 125

Hand Jacks

Heavy-duty hydraulic hand jacks, designed for both automotive service and general industrial use, are available in 30-, 50- and 100-ton models. These jacks operate in vertical or horizontal position. They are especially adapted to filter-press, shop-conversion and production-line applications, and are ideal for bending operations, lifting heavy loads, moving machinery, and pressing bushings. Center-balanced handle sockets aid in positioning and eliminate rocking, while the broad, flat, solid steel bases provide maximum security and convenient mounting. The base on each jack is tapped with ½-inch pipe thread to permit easy attachment of pressure gauges. (Weaver Mfg. Co.)

For more data circle No. 63 on postcard, p. 125

Heat-Resistant Gloves

Three new types of gloves reflect 90 pct of all radiant heat, in work where high temperatures are involved. The gloves have leather palms and aluminized asbestos backs and thumbs. This makes them particularly suitable for welding and cutting operations, furnace work, or any other operation where extreme radiant heat is an important

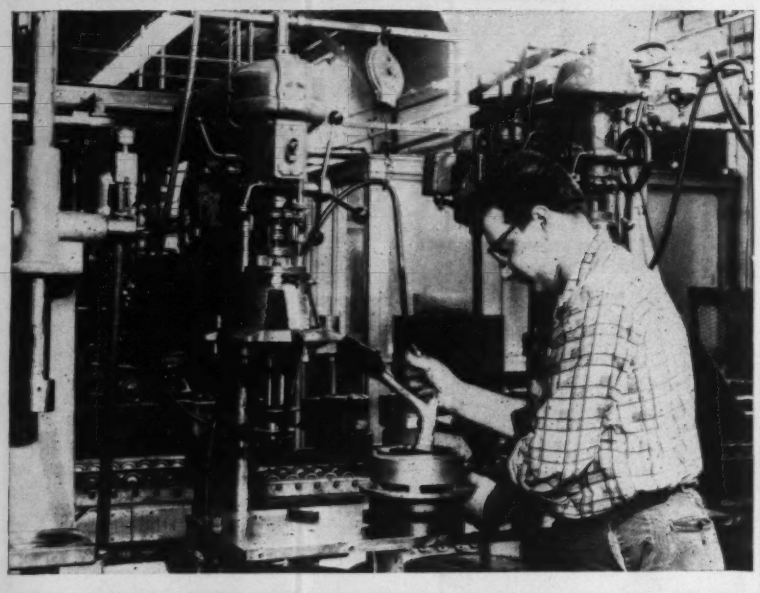
factor in efficient operation. The backs of the gloves are a combination of asbestos and a special heat-resistant fabric. Extremely flexible, the material is light, fully insulating and will neither crack nor peel even under the severest working conditions. (Air Reduction Sales Co.)

For more data circle No. 64 on postcard, p. 125

Optical Protractor

An optical universal protractor permits tool heads of any type to be adjusted to the prescribed angle of inclination. This can be done as easily as the tool heads are adjusted in the longitudinal direction.

WALKER-TURNER 20″ Drill Press



Pays for itself in six months

Drilling and tapping of parts used in assembling floor polishers at General Electric in Patterson, N. J., was formerly done on one Walker-Turner 20″ drill press. By adding a second W-T 20″ and equipping both drill presses with multiple-spindle attachments, output was tripled—and additional tooling paid for itself in six months.

You get this same kind of extra value in all W-T "Light-Heavyweight" metalworking tools because they are fast, accurate and built for years of rugged use. Your Walker-Turner Distributor (listed under "TOOLS" or "MACHINE TOOLS" in the Yellow Pages) carries the complete line. He'll gladly show you 20″, 17″, 15″ and the new 14″ Hi Speed drill presses in a variety of models to fit *your* production needs, as well as a complete line of money-saving accessories.

FREE CATALOG—Shows the full line of W-T metalworking tools and accessories. Write: Rockwell Manufacturing Company, Walker-Turner Division, Dept. WF-28, 400 N. Lexington Ave., Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Company of Canada, Ltd., Guelph, Ontario.

WALKER-TURNER
"LIGHT-HEAVYWEIGHT" MACHINE TOOLS
another fine product by
ROCKWELL

The protractor functions with a precision, up to this time, outside the scope of geodetic angular measuring instruments. The protractor consists of three main parts: the carrier shaft and the swing unit; the positioning mechanism for the measuring head; the optical equipment. (Miller Innsbruk)

For more data circle No. 65 on postcard, p. 125

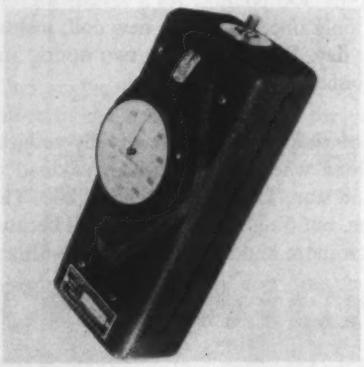
Hydrocarbon Removal

For use in steel plants, metal-fabricating plants, and petroleum refineries, a system removes entrained hydrocarbons and organic liquids from compressed air and gases. The product utilizes a system of porous materials. Initially, entrained liquids in the form of small droplets and mist are combined into larger sized droplets, and are removed from the system. Any droplets remaining in the system are further processed and removed by a specially-designed demisting section. Standard units, with capacities up to 7000 standard cu ft per minute at pressures up to 200 psig, are available. (Selas Corp. of America)

For more data circle No. 66 on postcard, p. 125

Force Gages

Precision mechanical force gages measure tension in a permanent test setup. The force indicator's free-floating transmission rod, which transmits the tension load to a dial



indicator, is threaded at its end for mounting in test apparatus or fixtures. The force gages are available in capacities of 20, 50, 75, 100, 150, 200, and 500 lb. The force-gage series is ruggedly constructed and housed in a cold-rolled steel case with a black wrinkle finish. Internal construction features a fully-compensated spring mechanism and a precise dial indicator. (Hunter Spring Co., a Div. of American Machine & Metals, Inc.)

For more data circle No. 67 on postcard, p. 125

Rotary Tables

Precision rotary tables can index from any point in 360° to any other point, with an accuracy of ±1.5 seconds of arc. These devices were specifically designed and developed for use as azimuth indicators in missile aiming systems. In this application, the tables will be equipped with optical devices and used to measure exact angular bearing from Polaris, the North Star. In addition to their extreme accuracy, these rotary tables also feature digital readout, which is said to insure unusual speed, ease and dependability of operation. Degrees, minutes and seconds are read directly on counter-type indi-

On Controlled Atmosphere Furnaces, Too

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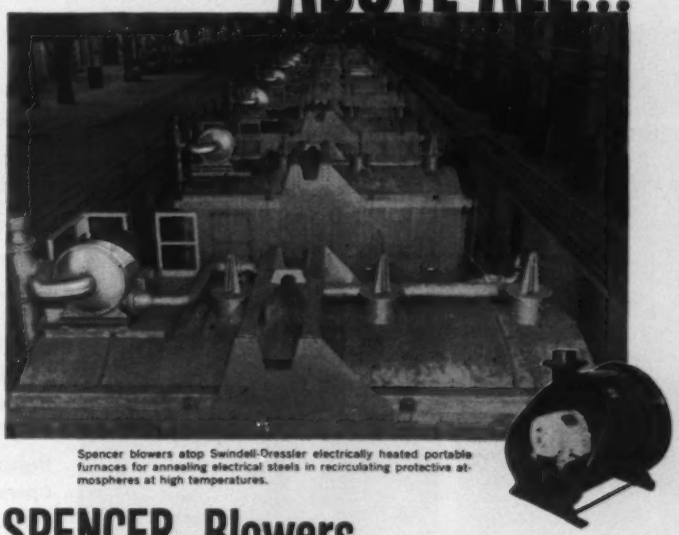

Spencer blowers atop Swindell-Dressler electrically heated portable furnaces for annealing electrical steels in recirculating protective atmospheres at high temperatures.

SPENCER Blowers

Where requirements are critical, you'll usually find SPENCER blowers, preferred because of their:

COMPLETE DEPENDABILITY—Simple, rugged construction (lightweight impellers the only moving parts) greatly diminishes danger of breakdown . . . lessens likelihood of service being needed.

NON-CONTAMINATION FEATURE—Complete absence of internal lubrication (all bearings are outside of casing) means atmosphere cannot become contaminated by oil.

COMPACTNESS—Solidly built . . . with no unnecessary bulk.

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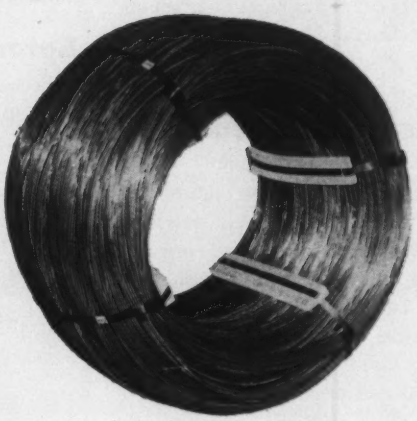
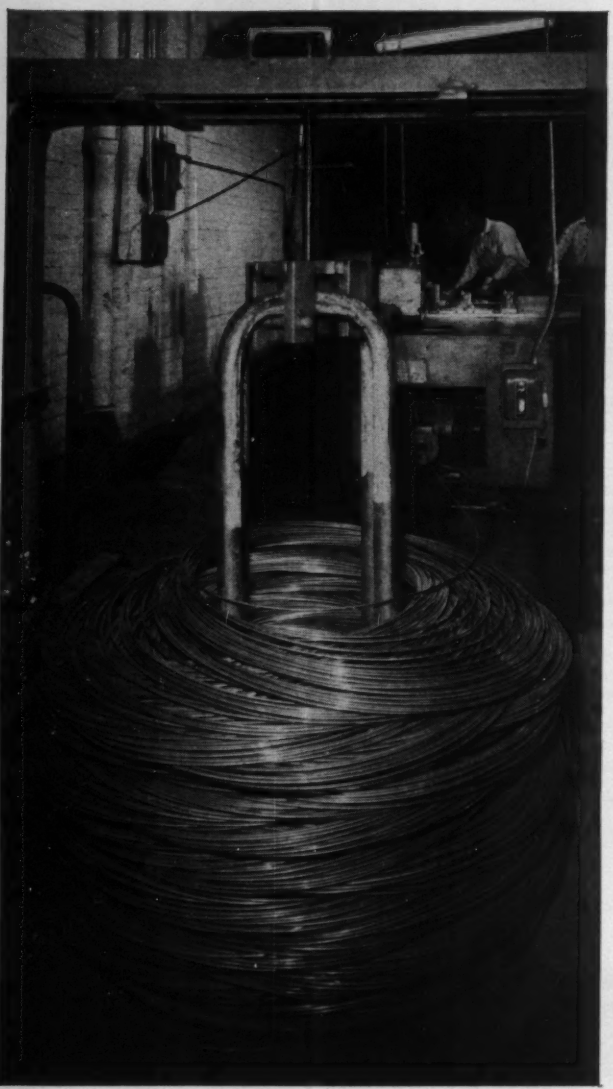


Compact shaped coil ready for shipment



"CF&I shaped coils have saved us 25% in storage, 20% in downtime, have increased our production by over 20%, and have enabled us to produce a higher quality product."—said Mr. Sol Lipshitz, president of Reforce Steel and Wire Corp., Brooklyn, New York.

Problem: "Previously with small coils, we had to stop our machine every 25 minutes to butt-weld the end of a new coil to the used-up coil. As we had to go to this trouble twenty times a day, we were losing 1½ to 2 hours daily in downtime," explained Mr. Lipshitz.

Solution: "A CF&I salesman carefully examined our operation; then he suggested that we use CF&I shaped coils which hold 2500 pounds of continuous length wire, as opposed to 200 or 300 pounds. As a result, we now stop our machine only once to start a new coil, instead of 10 times every day. We save nearly two hours, and have increased production by 20%.

"In addition, CF&I shaped coils have greatly reduced unloading time. Now when we receive a truckload of wire, we unload and store 15 pieces instead of 200. This not only saves time, but freight expenses as well because we now store much more and have to order one-fifth as often."

CF&I heavy coil mounted on spider for pay-off. This heavy coil contains 2500 pounds of continuous length of wire—enough wire for one-half day's production at the Reforce Steel and Wire Corp. "By virtually eliminating downtime with these heavy coils, we have increased production by 20%," said Reforce's president.

CUT DOWNTIME 20%

at Reforce Steel and Wire Corporation, Brooklyn, N. Y.

Heavy coils are quickly and easily placed on a revolving spider. The spider, which is leased from Wickwire, acts like a spool and assures smooth, even pay-off. "Because our machine jerks rather than drawing steadily, the small coils frequently pulled over and became tangled," explained Mr. Lipshitz. "CF&I heavy coils on spiders give us a steady flow of wire and make our operation more uniform."

Here you see some of Reforce's finished reinforcing accessories. "CF&I heavy coils have increased the quality of our product," said Mr. Lipshitz. "Small coils require frequent coil end welding. Sometimes, due to different coil melting temperatures, our automatic welding machine failed to make a good bond, forcing us to re-weld some faulty joints. CF&I long length coils have eliminated this problem."

Choose the CF&I wire package that offers one or more of the following benefits for your production:

- **less downtime with extra-long lengths of wire**
- **quick unloading and easy in-plant handling**
- **simplified inventory control**
- **assured cleanliness of the wire**

Our salesman will be glad to study your operation and recommend the wire package that will save you time and money. Call the nearest CF&I office today to set up a "no obligation" appointment.

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In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

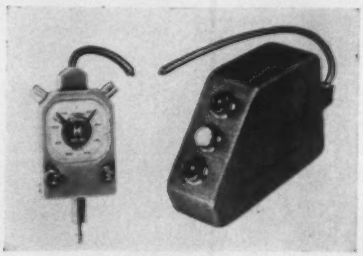
CF&I OFFICE IN CANADA: Montreal • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg 6946

cators. There are no optical scales or verniers, and errors due to individual interpretations are eliminated. The tables are exceptionally rugged and are suitable for any industrial applications where extremely accurate circular spacing or angular positioning is required. (Pratt & Whitney Co., Inc.)

For more data circle No. 63 on postcard, p. 125

Indicator

An electric indicator signals "out of tolerance." In this new gage, an electric signal is generated whenever established tolerance limits are exceeded. This signal can be used to turn on lights or for automatic control. By the addition of an adapter, the light box can be converted to a summarizing box for up to six electric indicators when gaging multiple dimensions. With this arrangement, an out of tolerance condition will be signaled by the "over" and/or "under" light. If all dimensions are within tolerance, the "good" light will signal. (Hamilton Watch Co.)



For more data circle No. 69 on potcard, p. 125

Tap Extensions

Fitting pipe taps from 1/16 to ½ in., tap extensions are made to close tolerances and are carefully heat treated. The 8-in. extensions make possible either machine or hand tapping of those otherwise inaccessible holes. A new feature introduced into these pipe tap extensions is that the socket screws are placed 90° apart, rather than 180° as previously placed. This gives an even better grip on the tap. (The Walton Co.)

For more data circle No. 70 on postcard, p. 125

Foundrymen and steel men! Princess Wenatchee and Junior are campaigning to get your vote for Chief Keokuk, standard bearer of the Kemco Silvery party. Kemco Silvery deserves your consideration. It is the superior form of silicon introduction. It rates your vote because it tops all other candidates for economy and performance. When you think of Silicon . . . think of KEMCO!

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The Iron Age Summary

Orders Can't Get Off Bottom

Incoming business is still disappointing. New orders aren't over the 50 pct of capacity rate.

June automotive production is strong. But other than automotive, most steel users are slow.

■ The rate of new orders for steel continues at a low level, indicating the "bottoming out" period is not yet over.

The volume of new business is not enough to justify an operating rate of more than 50 pct of capacity. The small improvement noted in recent weeks has not gained momentum. This means further declines in the operating rate are inevitable.

Two Main Reasons — The low level of business is caused by two principal factors:

One is the continued cutbacks of inventory levels by major steel users. It's estimated that consumers have been using steel at the rate of a million tons a month in excess of deliveries.

The second factor is the failure of many of the major steel users to really get going after the steel strike. This includes oil country goods users, the railroads, and heavy construction. Of these three, only heavy construction shows any hope of a resurgence.

Held Up By Autos—If it were not for heavy production schedules by the auto industry, the steel industry would be in a desperate situation. But even continued high auto production is not enough to sustain a high rate of steel production without support of other major consumers.

However, inventory cutbacks will have to come to an end soon. This fact, plus expected upturn in orders in July and August, indicate a comeback in steel operations in the late summer.

Production Schedules — Auto production for June is scheduled for 625,000 cars. This will result in a first half total of better than 3.8 million cars. However, automakers are concerned by the inventory of unsold 1960's, now estimated at 1,075,000 cars, the highest in history.

The cleanup problem and shutdowns for 1961 model changes will have to be faced soon by automakers and a decline in production is likely through July and August.

Fight for Sales—During the period of slow orders, mills are placing emphasis on service and delivery, with first delivery promises frequently getting the order. But even this is reaching the point of diminishing returns. Service is down to such a fine point that there is little difference between mills.

Price Softness—On the research side, steel companies are noting an increase in sample orders on new grades for tryouts. Users are requesting more information on new grades, as they take advantage of poor business to experiment on new products and techniques.

Price softness continues on many products and is reflected in new price concessions in warehouses. Several base price cuts are reported as well as cuts in some extras.

Steel Output, Operating Rates

Production	This Week	Last Week*	Month Ago	Year Ago
(Net tons, 000 omitted)	1,775	1,726	2,102	2,604
Ingot Index				
(1947-1949=100)	110.5	107.4	130.9	162.1
Operating Rates				
North East Coast	68.0	64.0	77.0	97.0
Buffalo	61.0	69.0	77.0	96.0
Pittsburgh	62.0	61.0	75.0	94.0
Youngstown	40.0	27.0	50.0	88.0
Cleveland	65.0	64.0	78.0	89.0
Detroit	83.0	81.0	99.0	97.0
Chicago	64.0	68.0	76.0	90.0
Cincinnati	64.0	60.0	88.0	84.0
St. Louis	80.0	77.0	80.0	96.0
South	61.0	54.0	73.0	93.0
West	67.0	63.0	70.0	90.0
U. S. Rate	62.3	60.6	73.8	92.0

*Revised
Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$31.50	$32.50	$33.17	$37.50
No. 2 bundles	$21.17	$21.83	$23.17	$25.17
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	101.00	100.125	99.00	104.00
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Casting Clinics Aid Purchasers

Purchasing agents and design engineers are now learning proper casting uses.

Gray Iron Founders Society program of teaching has attracted a great deal of attention from industry.

■ Drum beating by Gray Iron foundrymen on the virtues and proper use of castings is breaking through in earnest on purchasing agents and design engineers.

Almost 1000 purchasing agents and engineers have attended castings clinics of Gray Iron Founders Society so far. And a new independent consulting service is off to a good start, says Donald Workman, executive vice president of the Cleveland-based society.

High Hopes—Market-wise, the industry is hoping for a strong second half revival following a sharp inventory cutback in the first half.

"We have revised our forecasts for this year downward about 5 pct from what we originally hoped for," Mr. Workman says. "We now feel that shipments this year will be about 5 pct better than last year rather than 10 pct. This amounts to about 12.9 million tons rather than 13.5 million. But it would still be the best year since 1956 when it hit 13.8 million.

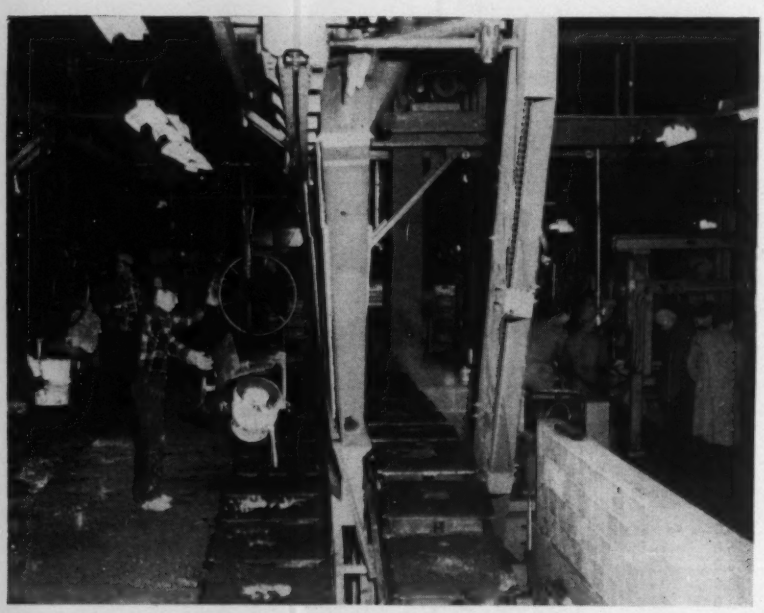
The "Same Boat" — "Foundries are now in the same boat as a lot of other industries when their customers start inventory reductions," Mr. Workman says. April shipments, for which we have figures, were rather low because of it. We feel that inventories will get worked down to normal by mid-year and there will be a strong revival in the second half. Sales have already shown some pick-up but is not reflected in production yet.

Most active consuming industries now are still autos, construction and machinery. With continued good outlays for capital goods indicated, we expect a strong finish for the year—just about the pattern of 1956. The babies born in World War II are growing up now to the point where home construction is due for a surge and this should help out industry outlook."

Big Attraction—The 29 castings design clinics held across the country by GIFS have attracted 901 engineers and purchasing agents so far from 453 companies. They are generating many inquiries for the foundrymen and bringing on more and more conversions from other fabrication methods.

Design Inquiries—Three movies and 8 strip films will be eventually produced for showing across desk tops to purchasing agents or for large gatherings. Subjects will include pattern cost saving, metallurgy and castings design.

The recently announced consulting service with designers for industry in Cleveland has generated a dozen design inquiries so far, although it has been announced publicly only a month. Inquiries on possible uses of castings or improvements are forwarded to the society for preliminary feasibility screening and then sent to Designers for Industry. This firm then will redesign the part on an independent consulting basis.



MOVING ALONG: Completed molds move on a conveyor to pouring area in a foundry. Foundrymen are now striving to acquaint industry people with the foundry business and proper use of castings.

Producing all Types of SPRINGS, WIRE FORMS *and* SMALL STAMPINGS *to Exact Specification*

U. S. Steel Wire springs and small stampings of high carbon steel can help keep your rejects to a minimum while lowering your production costs. That's because rigid quality control and close inspection are standard operating procedures in our handling of your orders. Since dependable springs or small stampings and better products go hand-in-hand, why not let us quote on your requirements.

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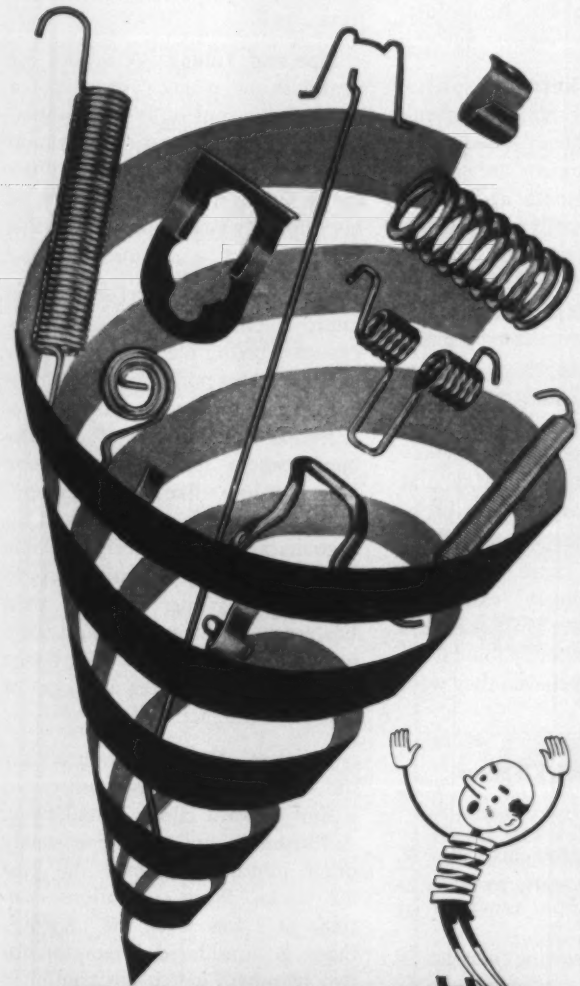

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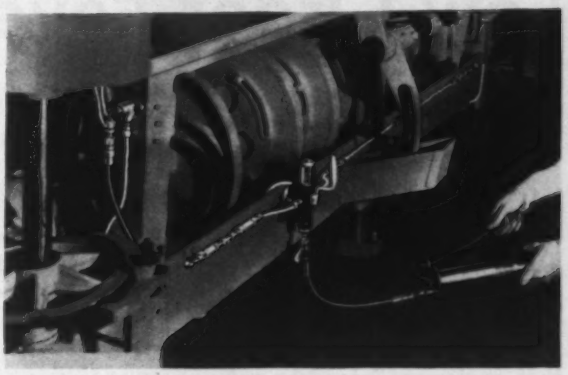

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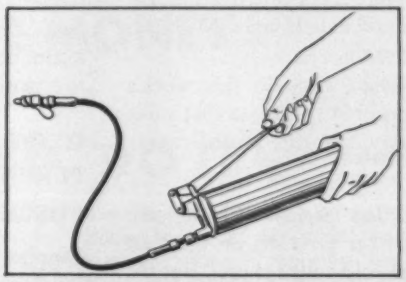
NON-FLUID OIL is the ideal pressure system lubricant. It is long lasting, dependable and economical. NON-FLUID OIL is made in grades suited to every need.

Write for free testing sample and Bulletin 552.



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NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture. So-called grease imitations of NON-FLUID OIL often prove dangerous and costly to use.

Low Order Level Plagues Market

U. S. steel mills can produce more finished steel than ever before.

But there's little to indicate that customers intend to put a strain on this capacity.

■ Finished steel capacity of U. S. steel mills has increased by 10.2 million tons since 1957. Current annual capacity for hot-rolled sheets, bars, plates, structural shapes, rails and other products is 113.8 million net tons, according to the American Iron and Steel Institute.

Thirty-one states now have hot-rolling facilities compared with 29 in 1957. Two new producers are Florida and Hawaii, each with 45,000 tons bar capacity.

Greatest increase in hot-rolling capacity was made by Ohio which added 1.7 million net tons between 1957 and 1960. Next largest increases were in Pennsylvania, Indiana, Maryland, Illinois, Michigan and California.

But there's little in this week's market report to indicate that mills will be straining this record capacity.

Sheet and Strip — Among the better market products on the **East Coast** are cold-rolled sheets. But the desire of customers to hold inventories to a minimum still hurts. And one large sheet user is still working out from under conversion tonnage booked months ago.

Reports from **Pittsburgh** mills of an improvement in orders are hardly enough to excite producers. For example: Sheet orders for one mill were better in May than in April. June orders are expected to equal May. And third quarter auto tonnage received so far has been better than expected. But the mill still looks for operations to drop to around 50 pct in the June - July period.

Midwest Markets — Frantic scrambling to plug holes in inventories seems to have lessened in **Cleveland.** Inventories are better balanced than a month ago. Users are still leaning heavily on mills for fast delivery, but the fierce delivery competition of recent weeks has eased—there's little difference in delivery promises being made by mills.

Several automakers in **Detroit** have had to come into the market for additional tonnage to carry them through the 1960 build-out. Higher-than-expected output in May and increased schedules for June probably account for increased buying.

Chicago mills have received requests for delivery extensions from appliance manufacturers again, despite an already low inventory position. It's believed they want to sit out the summer vacation period before committing themselves.

Bars—Mills in the **Pittsburgh** district feel it will take an automotive push to bring about any real improvement in the hot-rolled bar market. Orders have been falling off since April, and July doesn't seem to offer much. There's little encouragement elsewhere. Cutbacks by automotive and farm equipment producers have further weakened the market in **Chicago.** Price cutting in concrete paving mesh was also reported in the **Midwest.** Warehouses are cutting stocks of cold-finished bars because mills are able to offer just about as good delivery from stock.

Pipe and Tubing—A serious lag continues to plague producers of oil country seamless. It's a combination of inventory adjustment and basic weakness of demand. **Pittsburgh** producers say they have little hope for any real improvement this year.

Plates and Shapes—Little or no improvement in a lifeless market is expected before the end of the year by **East Coast** mills, some of which are operating on short work-weeks. A similar situation prevails in **Pittsburgh** where one sales executive notes: "It looks like a dry summer." A brighter tone is noted in the **Chicago** market. Plate is freely available for quick delivery, but mills seem to be rolling greater volume than Eastern mills. Structurals also seem to be holding up. Some wide flange mills are still operating at 80 pct of capacity or higher.

Stainless—Stainless producers say the shake-out period has ended and a slow upward climb is underway. A **Pittsburgh** mill reports a steady order improvement over the past six weeks. While operations continue at a low level, the improvement is considered important for two reasons. First, it has continued over a six-week period. Second, stainless generally leads carbon steel in a decline or an upturn. The order gain reflects immediate business for the most part with mills offering prompt delivery out of inventory.

PURCHASING AGENT'S CHECKLIST

Despite vexing problems, the St. Lawrence Seaway starts to make itself felt. P. 63

Foundries are showing interest in adapting oxygen steelmaking techniques. P. 67

Tom Campbell, IRON AGE Editor-in-Chief, studies business outlook. Best prediction is for a mild recession, he says. P. 68

COMPARISON OF PRICES

(Effective June 7, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	June 7 1960	May 31 1960	May 10 1960	June 9 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.60	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Bas price	6.196¢	6.196¢	6.196¢	6.196¢

	June 7 1960	May 31 1960	May 10 1960	June 9 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$31.50*	$33.50	$34.50	$42.50
No. 1 steel, Phila. area	33.50*	34.50	34.50	35.50
No. 1 steel, Chicago	29.50	29.50	30.50	34.50
No. 1 bundles, Detroit	27.50	27.50	29.50	35.50
Low phos., Youngstown	34.50*	35.50	36.50	41.50
No. 1 mach'y cast, Pittsburgh	49.50	49.50	50.50	49.50
No. 1 mach'y cast, Phila.	51.50	51.50	51.50	49.50
No. 1 mach'y cast, Chicago	48.50*	49.50	51.50	57.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$31.50*	$32.50	$33.17	$37.50
No. 2 bundles	21.17*	21.83	23.17	25.17
Coke Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$33.00	$33.00	$33.00	$31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	101.00*	100.125	99.00	104.00
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

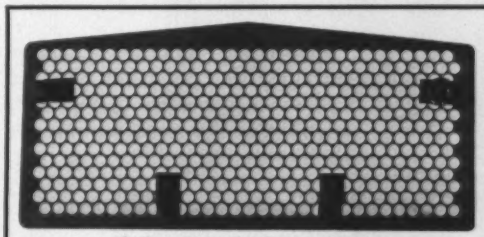
Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

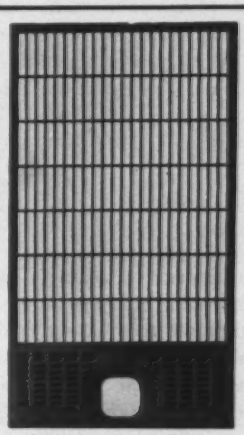
INDEX TO PRICE PAGES

Prices At a Glance 149
Comparison of Prices 153
Bars 162
Billets, Blooms and Slabs 106
Boiler Tubes*
Clad Steel*
Coke 165
Electrical Sheets*
Electrodes*
Electroplating Supplies
Fasteners 164
Ferroalloys 166
Iron Ore 164
Merchant Wire Products 164
Metal Powders*
Nonferrous
  Mill Products 159
  Primary Prices 153-158-159
  Remelted Metals 159
  Scrap 159
Piling 160
Pig Iron 164
Pipe and Tubing 165
Plates 162
Rails*
Refractories*
Service Center Prices 163
Shapes 160
Sheets 161
Spring Steel*
Stainless 164
Steel Scrap 156
Strip 160
Structurals 160
Tinplate 161
Tool Steel 164
Track Supplies*
Water Pipe Index 165
Wire 162
Wire Rod 161

* Appears in the June 2 - June 16 issues.



Rodent Guard for Electric Motor



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Manufacturers of DIAMOND Perforated Metal Panels for Modern Acoustical Ceilings.

Prices Hit Lowest Level Since '58

Market weakness has dropped The IRON AGE Composite to $31.50 the lowest since April, 1958.

Only in export areas are steelmaking grades showing any sales zip.

▪ With demand sagging, scrap prices have dropped to their lowest level in years.

Declines at Pittsburgh and Philadelphia pushed the IRON AGE No. 1 Heavy Melting Composite to $31.50. This was the first time since April, 1958 the Composite has fallen below $32. And is only about $8 above the eight-year low of $23.33 set in March, 1954. Highest price for the IRON AGE Composite was the $65.17 of December, 1956.

In several major markets No. 1 Heavy Melting is around the lows of 1954.

Demand Lacking — Domestic interest in scrap is doing nothing to stimulate the market. Mills are not anxious to use dealer scrap. And even limited buys drive prices down. Much of the market's activity is in industrial scrap and cast grades.

With the mill operating rate moving into the low 60s, there's not much room for improved prices or greater sales. Export demand for scrap is helping hold up the market somewhat in costal districts. But this influence may taper off during the summer.

Pittsburgh—Prices here dropped again, reflecting weak demand and lack of optimism for the future. The largest local consumers remain out of the market. Scrap men won't speculate on when buyers will be back. Heavy melting grades and bundles are off $1 or $2. Relatively heavy tonnages of No. 1 heavy have been offered to one mill at $32. Dealers are being quoted $31 for No. 1 heavy melting and $26 for No. 2 heavy melting by a mill on the fringe of the district.

Chicago—Prices on some grades drifted downward. The chief drop-off was in railroad grades, but both cast and electric furnace grades also showed weakness. Small lots of factory bundles also moved at lower prices. Industrial scrap collections continue falling off.

Philadelphia — Limited tonnage purchases by a local mill dropped steelmaking grades by $1. Dealers and brokers had been waiting this expected purchase to see its effect on the market. Otherwise, the story is still the strong flow of tonnage into port areas for export.

New York — Export orders, key factor in this market for the last few months, are showing renewed signs of strength. Export sales trailed off just before the recent Memorial Day weekend. Now, dealers say overseas sales have regained former levels.

Detroit — Sales to mills are not developing. Some trade sources say it will be at least late July before mills want dealer scrap. There are reports of many bundles of Detroit scrap sitting in Canada. Rejections have been high both there and by local mills. Price of drop forge flashings in last week's issue was incorrectly listed. Correct price is $25 to $26.

Cleveland—Two-week-old orders for industrial and dealer yard scrap at $33 and $35 are being filled. But supply sources are drying up again. Speculators are starting to move into the market as it nears the $30 mark. An area plant list brought $30.80 for unprepared heavy melting and $36 for 2 ft low phos.

St. Louis — The market here remains in a depressed condition. There is very little demand and an oversupply of scrap. Turnings, railroad, and cast grades are especially weak, with some grades down $1.

Cincinnati — Some mills are in the market for small tonnages from a few yards. But overall activity is very slow. The local delivered price to dealers for No. 1 industrial scrap is $30. Cast grades are slow.

Birmingham — Some electric furnace and foundry grades are moving, but in small-sized orders. Prices on some of these grades slipped off, in most cases $1. A district electric furnace, expected to buy heavily, purchased only limited amounts. Plants outside the area cut prices $1 on cupola cast. Electric furnace bundles were incorrectly quoted last week. Price should have been $33 to $34, the present level.

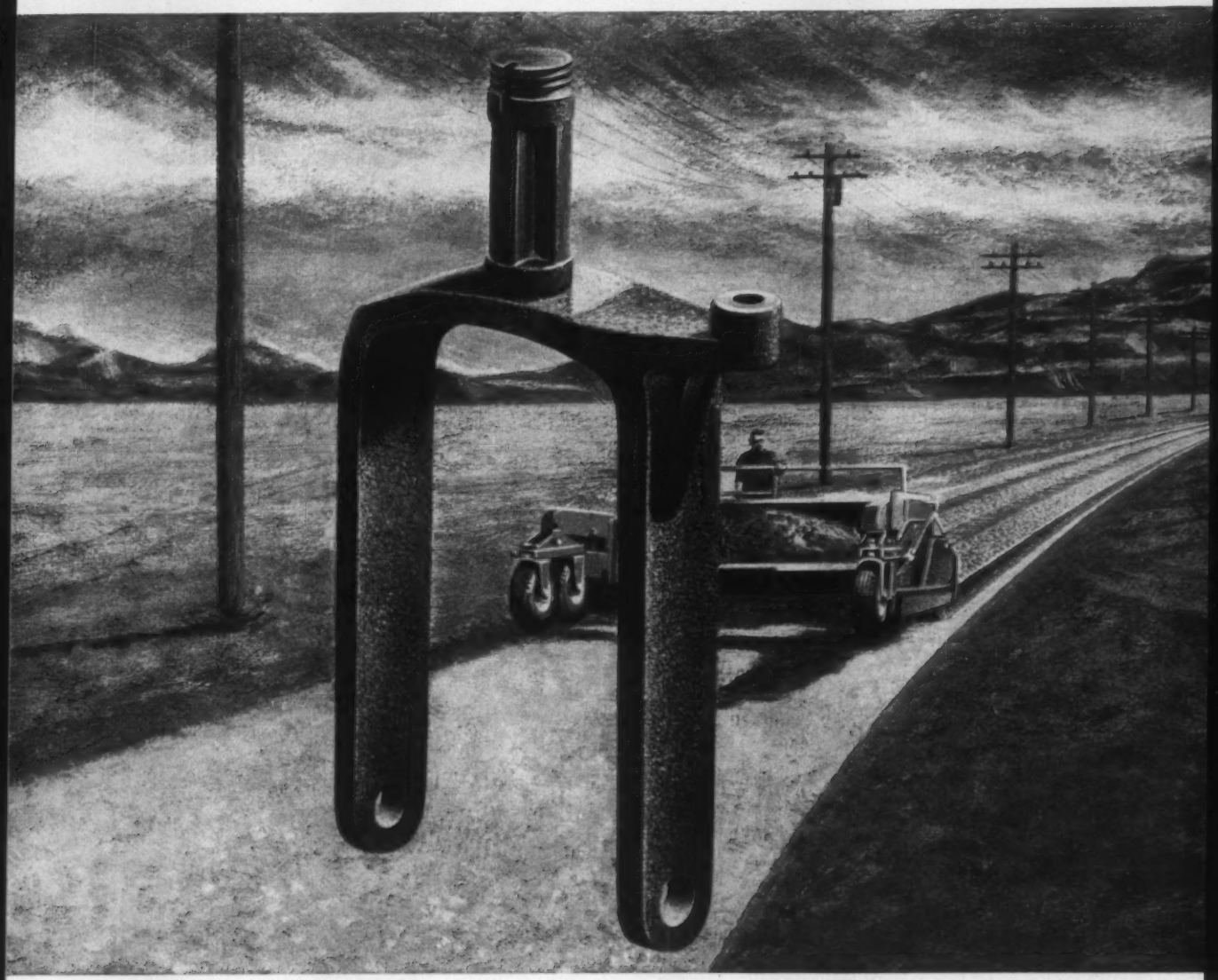
Buffalo — The market remains only moderately active. Sales of No. 1 heavy melting, No. 2 heavy melting, No. 1 bundles, and No. 2 bundles were all made at quoted prices.

Boston — The market remains static. Both export and domestic sales are limited. Dealers are far from busy. Prices of turnings dropped.

West Coast—Mill buying is at a standstill. Some 100,000 tons of scrap are scheduled to leave West Coast ports for Japan this month.

Houston—The cast market here has weakened and the market for turnings has disappeared. Cupola cast and heavy breakable cast are down $1. Machine shop turnings and shoveling turnings are off $3.

How the Foundry Industry Serves America . . . #6 of a Series



CAST IRON WHEEL FORK REPLACES WELDMENT . . . CUTS COST 29%

Rugged construction of every single part is vitally important in the manufacture of road building equipment.

Capable of spreading up to 400 tons of base materials per hour, the aggregate hopper of the 12-ton base paver, shown above, is supported and steered by front wheel forks. These must take a terrific pounding day after day, to assure maximum service life for the entire unit. Originally the forks were made from steel weldments. They were redesigned to high strength gray iron castings. This reduced manufacturing operations from nine to three, and cut fabricating costs by over 29%. This is just another example of how modern iron castings can solve many of the problems of industrial design and at the same time effect substantial manufacturing savings.

For the production of structurally sound iron castings, Hanna Furnace provides foundries with all regular grades of pig iron . . . foundry, malleable, Bessemer, intermediate low phosphorous, as well as HANNA-TITE® and Hanna Silvery.

Facts from the files of Gray Iron Founders' Society

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THE HANNA FURNACE CORPORATION
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Hanna Furnace is a division of **NATIONAL STEEL CORPORATION**

SCRAP PRICES *(Effective June 7, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	36.00 to 37.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings.	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate.	39.00 to 40.00
Heavy turnings	27.00 to 28.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	49.00 to 50.00
Rails 2 ft. and under	56.00 to 57.00
RR specialties	46.00 to 47.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	41.00 to 42.00
Stainless	
18-8 bundles and solids.	195.00 to 200.00
18-8 turnings	95.00 to 100.00
430 bundles and solids.	105.00 to 110.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	30.00 to 31.00
No. 1 factory bundles	34.00 to 36.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. forge crops	41.00 to 42.00
Low phos. punch'gs plate, ¼ in. and heavier	35.00 to 36.00
Low phos. 2 ft. and under.	33.00 to 34.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	50.00 to 51.00
Rails 2 ft. and under	49.00 to 50.00
Angles and splice bars	42.00 to 43.00
RR steel car axles	48.00 to 49.00
RR couplers and knuckles	39.00 to 40.00
No. 1 machinery cast.	48.50 to 49.00
Cupola cast.	43.00 to 44.00
Cast iron wheels	34.00 to 35.00
Malleable	46.00 to 47.00
Stove plate	37.00 to 38.00
Steel car wheels	39.00 to 40.00
Stainless	
18-8 bundles and solids.	180.00 to 190.00
18-8 turnings	90.00 to 95.00
430 bundles and solids.	90.00 to 95.00
430 turnings	45.00 to 50.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy melting	29.00 to 30.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings.	25.00 to 26.00
Low phos. 5 ft and under.	37.00 to 38.00
Low phos. 2 ft punch'gs.	39.00 to 40.00
Elec. furnace bundles	37.00 to 38.00
Heavy turnings	28.00 to 29.00
RR specialties	41.00 to 42.00
Rails, 18 in. and under.	56.00 to 57.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	40.00 to 41.00
Cast iron car wheels	43.00 to 44.00
Malleable	53.00 to 54.00
No. 1 machinery cast.	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.50 to $27.50
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	26.50 to 27.50
No. 2 bundles	17.00 to 18.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Low phos. 18 in. and under	35.00 to 36.00
Rails, random length	45.00 to 46.00
Rails, 18 in. and under	51.00 to 52.00
No. 1 cupola cast.	36.00 to 37.00
Hvy. breakable cast.	35.00 to 36.00
Drop broken cast.	47.00 to 48.00

Youngstown

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	34.00 to 35.00

Cleveland

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	30.00 to 31.00
No. 1 factory bundles	34.00 to 35.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	36.00 to 37.00
Drop forge flashings	30.00 to 31.00
Low phos. punch'gs plate.	31.00 to 32.00
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	33.00 to 34.00
Rails 2 ft. and under	52.00 to 53.00
Rails 18 in. and under	53.00 to 54.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	52.00 to 53.00
No. 1 machinery cast.	52.00 to 53.00
Stove plate	41.00 to 42.00
Malleable	49.00 to 50.00
Stainless	
18-8 bundles	195.00 to 200.00
18-8 turnings	90.00 to 95.00
430 bundles	95.00 to 100.00

Buffalo

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 busheling	30.00 to 31.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	16.00 to 17.00
Low phos. plate	40.00 to 41.00
Structurals and plate, 2 ft and under	40.00 to 41.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	46.00 to 47.00
No. 1 cupola cast.	42.00 to 43.00

St. Louis

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	28.00 to 29.00
Foundry steel, 2 ft	31.00 to 32.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	16.00 to 17.00
No. 1 RR hvy. melting	32.00 to 33.00
Rails, random lengths	38.00 to 39.00
Rails, 18 in. and under	42.00 to 43.00
RR specialties	39.00 to 40.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	33.00 to 34.00
Stove plate	38.00 to 39.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	48.00 to 49.00
Unstripped motor blocks	36.00 to 37.00

Birmingham

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	33.00 to 34.00
Elec. furnace, 3 ft & under	32.00 to 33.00
Bar crops and plate	37.00 to 38.00
Structural and plate, 2 ft.	36.00 to 37.00
No. 1 RR hvy. melting	28.00 to 29.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	39.00 to 40.00
No. 1 cupola cast.	48.00 to 49.00
Stove plate	48.00 to 49.00
Cast iron car wheels	42.00 to 43.00
Unstripped motor blocks	38.00 to 39.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings.	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	180.00 to 185.00
18-8 turnings	80.00 to 85.00
430 prepared solids	75.00 to 80.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	25.00 to 26.00
Drop forge flashings	25.00 to 26.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
Heavy breakable cast.	30.00 to 31.00
Mixed cupola cast.	34.00 to 35.00
Automotive cast.	43.00 to 44.00
Stainless	
18-8 bundles and solids.	175.00 to 180.00
18-8 turnings	60.00 to 65.00
430 bundles and solids.	60.00 to 65.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.50 to $25.50
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.50 to 25.50
No. 2 bundles	13.00 to 14.00
No. 1 busheling	24.50 to 25.50
Machine shop turn.	5.00 to 6.00
Shoveling turnings	7.50 to 8.50
Clean cast. chem. borings.	13.00 to 14.00
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00

San Francisco

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	30.00
No. 2 bundles	20.00
Machine shop turn.	$14.00 to 15.00
Cast iron borings	14.00 to 15.00
No. 1 cupola cast.	46.00

Los Angeles

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	27.00
No. 2 bundles	17.00
Machine shop turn	15.00
Shoveling turnings	15.00
Cast iron borings	$15.00 to 16.00
Elec. furn. 1 ft and under (foundry)	42.00 to 43.00
No. 1 cupola cast.	42.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$25.80
No. 2 hvy. melting	25.50
No. 1 dealer bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bush., new fact., prep'd	25.50
Bush., new fact., unprep'd	20.45
Machine shop turn.	12.00
Short steel turn.	12.00
Mixed bor. and turn	12.00
Cast scrap	43.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	19.00
Machine shop turn.	12.00
Shoveling turnings	14.00
Cut structural plate 2 ft. & under	$40.00 to $41.00
Unstripped motor blocks	28.00 to 29.00
Cupola cast.	33.00 to 34.00
Heavy breakable cast.	25.00 to 26.00

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Lead, Zinc Bill Stalled in House

Deadlock in House Committee probably dooms lead, zinc relief for this session.

Even if it gets out of committee, passage would be doubtful as adjournment looms.

▪ Domestic lead and zinc miners are getting a lot of frustration but little relief in this session of Congress.

The House Rules Committee late last week dead-locked 6 to 6 on a bill to provide government subsidies to small lead and zinc producers. This means that HR 8860, the bill, is probably lost in the Committee.

Little Encouragement—Rep. Ed. Edmondson (D., Okla.), sponsor of the bill, nevertheless convinced the Rules Committee to reconsider the bill again this week. But most of the bill's supporters were pessimistic. They expected the Committee vote to stand. Some said that even if it got out of committee it might never reach a vote in the House. And even if it did, it would probably be defeated.

Domestic lead and zinc miners say they need help because low-cost imports have driven prices low enough to put many small and marginal operations in serious trouble.

What Alternatives?—According to Congressional sources, the bill was held up because opponents, led by Rep. Clarence J. Brown (R., O.), feel HR 8860 is not the proper way to give aid to domestic lead and zinc miners.

Rep. Brown, and other opponents, generally concede small lead and zinc producers have been hit hard by imports. But they believe granting government subsidies would only lead to a flood of similar bills in behalf of industries in a similar fix.

Opponents suggest some other kind of relief be considered. But there are few concrete suggestions. One Congressman says it would be better to repeal the Reciprocal Trade Agreement the U. S. has with some foreign countries. This, he points out, has been holding tariffs down.

Lower, Not Higher — But the Administration is aimed more at lowering, rather than raising tariffs, and that there is no chance of action of this nature.

Rep. Edmonson's reason for singling out lead and zinc is that its case for help is particularly well documented. The Tariff Commission, he points out, in hearing cases on claims of injury from miners, has said the injury is obvious.

Some in the House comment that a subsidy is generally viewed unfavorably by the voting public, and this is an election year.

Senate Action?—The House Interior and Insular Affairs Committee, which has approved the bill, feels the bill still has a chance, but not in the House. It has more support in the Senate, members say.

But the Senate hasn't even held hearings on the duplicate bill it has. A compromise bill now is more likely.

However, the bills are starting to pile up under the weight of a mid-July cutoff date for new bills. And indications are that Congress will lean heavily toward what it considers more important bills. So it looks like time may just run out on the small U. S. zinc and lead miners —again.

The Provisions—HR 8860 would provide for government payment to lead and zinc producers of the difference between the market prices, and prices set in the bill, to a limit.

The current price of lead is 12¢ per lb, and zinc 13½¢ per lb, at New York. The bill set the points below which subsidies would be paid at 14½¢ per lb for lead and 17¢ per lb for zinc. The subsidies would be for mines that produced less than 2000 tons of either metal in a year.

Tin prices for the Week. June 1 —100.125; June 2—100.50; June 3—100.75; June 6—101.00; June 7—101.00*.
*Estimates.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in MAY based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	33.00
Copper, Lake	33.00
Straits, Tin, New York	99.541
Zinc, E. St. Louis	12.90
Lead, St. Louis	11.80
Aluminum ingot	28.10

Note: Quotations are on going prices

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-180	182-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 159.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.9

Screw Machine Stock—2011-T-3

Size"	¼	⅜-½	⅝-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.822
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	128
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.37	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.12	.....

Free Cutting Brass Rod..... 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismouth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb).... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz. $2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $213 to $215
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $24 to $26
Platinum, dollars per troy oz... $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $42.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 29.25
No. 120 ..... 28.25
No. 123 ..... 27.25
80-10-10 ingot
No. 305 ..... 33.75
No. 315 ..... 31.50
88-10-2 ingot
No. 210 ..... 42.00
No. 215 ..... 38.75
No. 245 ..... 34.00
Yellow ingot
No. 405 ..... 23.75
Manganese bronze
No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 25.75-26.00
0.60 copper max. 25.50-25.75
Piston alloys (No. 132 type).. 28.00-29.00
No. 12 alum. (No. 2 grade)... 24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)... 25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

(Effective June 7, 1960)

Steel deoxidizing aluminum notch bar granulated or shot
Grade 1—95-97½% 25.25-26.25
Grade 2—92-95% 24.00-25.00
Grade 3—90-92% 23.00-24.00
Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¼
No. 2 copper wire 24¼
Light copper 22
*Refinery brass 22¼
Copper bearing material 21
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¾
No. 2 copper wire 23¾
Light copper 21½
No. 1 composition 20¼
No. 1 comp. turnings 19¾
Hvy. yellow brass solids 15
Brass pipe 14
Radiators 16

Aluminum

Mixed old cast. ..... 14 —14½
Mixed new clips ..... 15 —16
Mixed turnings, dry ..... 14 —15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 22¾—23
No. 2 copper wire ..... 20½—21
Light copper ..... 18½—19
Auto radiators (unsweated). 12½—13
No. 1 composition ..... 17 —17½
No. 1 composition turnings.. 15½—16
Cocks and faucets ..... 13 —13½
Clean heavy yellow brass ... 11¾—12¼
Brass pipe ..... 13½—14
New soft brass clippings .... 14 —14½
No. 1 brass rod turnings .... 11½—12

Aluminum

Alum. pistons and struts .... 7½— 8
Aluminum crankcase ..... 11¼—11¾
1100 (2s) aluminum clippings 15 —15½
Old sheet and utensils ..... 11¼—11¾
Borings and turnings ..... 7 — 7½
Industrial castings ..... 11¼—11¾
2020 (24S) clippings ..... 12½—13

Zinc

New zinc clippings ..... 7 — 7¼
Old zinc ..... 4½— 5
Zinc routings ..... 3¼— 3½
Old die cast scrap ..... 2¾— 3

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 28-29
Clean Monel turnings 20-23
Old sheet Monel 24-26
Nickel silver clippings, mixed 13
Nickel silver turnings, mixed 15

Lead

Soft scrap lead ..... 8 — 8¼
Battery plates (dry) ..... 3 — 3½
Batteries, acid free ..... 2 — 2¼

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 55 —56
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 9¾—10¼
Solder joints ..... 13¼—13¾
Siphon tops 41
Small foundry type ..... 9¾—10¼
Monotype ..... 9¾—10¼
Lino. and stereotype ..... 8¾— 9
Electrotype ..... 7½— 7¾
Hand picked type shells .... 5¼— 5¾
Lino. and stereo. dross ..... 2½— 2¾
Electro dross ..... 2¼— 2¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Castle, Pa.									7.425* *M8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective June 6, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.825 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.825 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

? Electrogalvanized sheets.

(Effective June 6, 1960)

*7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Conshohocken, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Harrisburg, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*	5.825 *M7*					5.30 *P2*	6.375 *P2*			
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,13, Y1*	5.675 *U1,13, Y1*	7.65 *R3,J3*	6.725 *U1,13, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,13, Y1*	6.375 *J3, 11*	7.50 *U1, Y1*	7.95 *U1, Y1,13*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective June 6, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	97.3	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore**	$.10	8.63	10.10	10.16	11.04	9.25	10.02	9.43	11.90	17.48	16.48	21.58	20.83
Birmingham**		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	.....	.....	.....
Boston**	.10	9.77	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.89	10.35	11.10	10.55	8.82	9.48	8.99	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	9.06	10.41	11.10	10.87	9.20	10.04	9.31	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	9.15	10.61	11.45	10.92	9.19	10.04	9.30	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	10.03	12.193	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.50[1]	11.29	12.20	11.29	9.82	10.54	9.67	14.20	18.30	17.35	22.90	22.20
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	9.03	10.49	11.24	10.69	8.96	9.70	9.13	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	16.16	16.50	20.10	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia**	.10	8.95	10.10	10.99	10.95	9.30	9.95	9.35	12.05	17.58	16.58	21.68	20.93
Pittsburgh**	.15	8.88	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	10.27	11.79[2]	11.55	11.88	9.82	10.50	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**		10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.99	10.73	11.48	10.65	8.93	9.60	9.10	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	9.19	9.74	10.89	10.81	9.10	9.78	9.27	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate—¼ x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-Rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective June 6, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective June 6, 1960)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* wensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	193	...	214	199	9.10	9.85
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	...	...	...	...	...	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	...	...	...	...	...	9.00	9.55
Cleveland *A6*	...	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	9.00	...
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	...	...	...	...	...	...
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	...	...	...	...	...	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	...	...	...	...	...	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	...	...	...	236	...	9.95	10.50
Sparrows Pt. *B3***	175	...	...	215	198	9.10	9.775
Struthers, O. *Y1**	...	...	...	...	...	8.65	9.20
Worcester *A5*	179	...	...	...	...	9.30	9.85
Williamsport *S5*	...	...	...	...	...	...	...

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $290 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	⅛ In.		¼ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	9.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	9.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	9.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*6.25	.....	*2.25	.....	0.75	.....	1.25	.....	1.75	.....	2.25	.....	2.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ⅛, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	135.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 8 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

	Net-Ton
Furnace, beehive (f.o.b.)	
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

HOW LONG SINCE YOU CHECKED ON PERFORATIONS?

No matter what material your product demands Mundt can supply the exact perforation you need. Steel, brass, copper, monel, bronze, aluminum, zinc, tinplate, lead, stainless steel, coated metals, bonded materials, plastics, and paper are punched as required for every functional and ornamental need.

You can count on Mundt's guarantee that sheets are perfectly flat, straight, parallel on the sides, and free from buckle or camber.

Our modern tool and machine shop is constantly making new dies to add to the tremendous variety of screens available. If you have a special problem we'll gladly supply design and metallurgical assistance.

No job is too small for our careful, personal attention . . . or too large for prompt delivery. Mundt's 90 years' experience is at your disposal.

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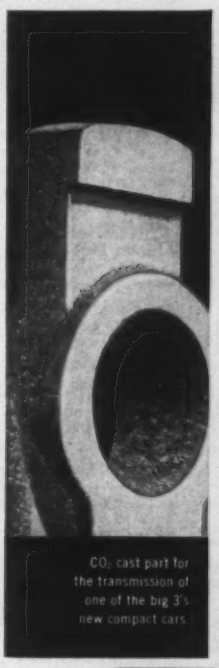
PERFORATING SPECIALISTS FOR ALL TYPES OF MATERIALS



CO_2 cast part for the transmission of one of the big 3's new compact cars.

MODERN CO_2 MOLDING CUTS REJECTS FROM 9% TO LESS THAN 0.1%

PLUS:

Better Weight Control
Closer Tolerances
Improved Finish
Uniform Quality
at the same cost as green sand castings.

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GREAT LAKES FOUNDERS & MACHINE CORP.
LUDINGTON, MICH.

SPECIALISTS IN STACK-, CO_2, AND SHELL-MOLD CASTING

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	32.75
0.05% C....	33.50	1.00% C....	32.50
0.10% C....	33.25	1.50% C....	32.25
0.20% C....	33.00	2.00% C....	32.00

4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 31.50
5-7% C, 61-65% Cr, 5-8% Si 22.00
5% max C, 50-55% Cr, 2% max Si.. 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.
0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.
Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.)
Carloads, delivered, lump, 3-in. x down, packed.
Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	24.50	14.60
Ton lots	29.75	16.05
Less ton lots	31.35	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.
Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:
Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19% ..	$98.00	$96.00	$100.50
19-21% ..	100.00	98.00	102.50
21-23% ..	102.50	100.50	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C.	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.
Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.
Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.
Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective June 6, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.
Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound
Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.
Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

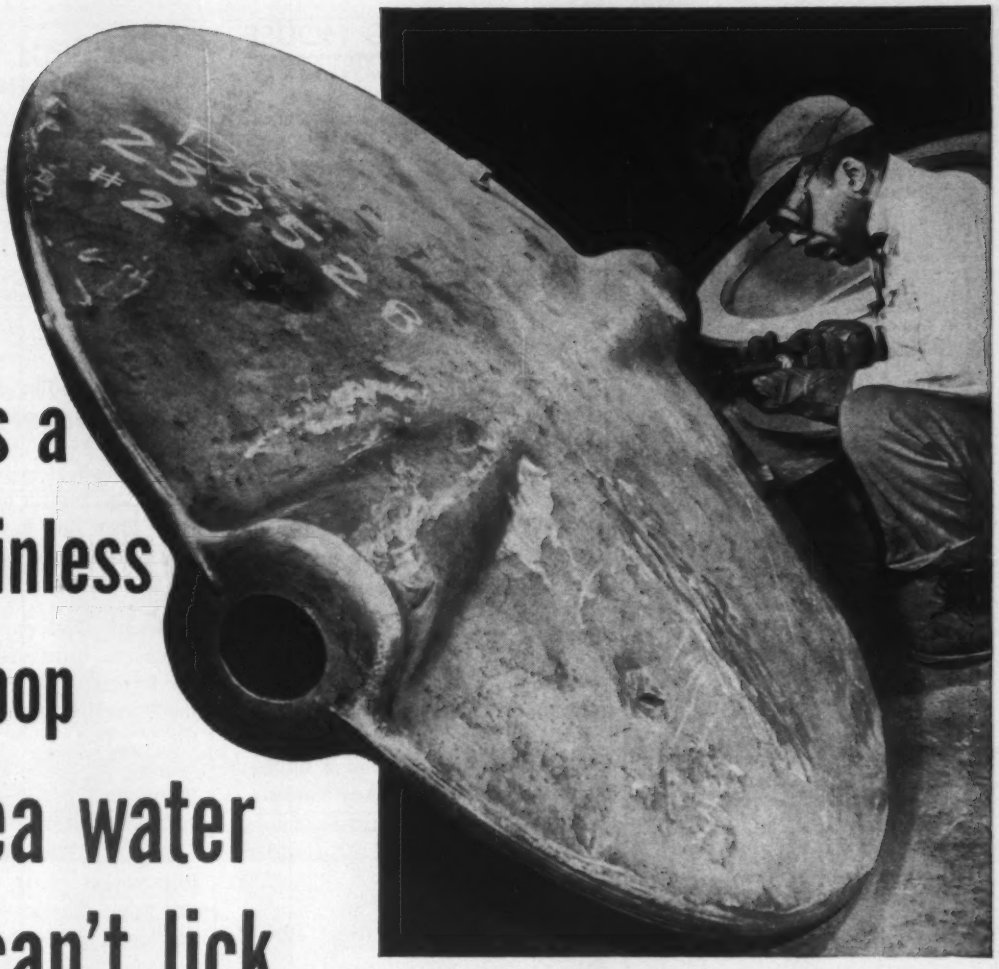
Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.. $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

Here's a stainless lollipop sea water can't lick



This large (48″ dia., 1701 lbs.) and unusual stainless casting was fabricated by Allegheny Ludlum's Buffalo, N.Y. foundry. It is scheduled for service under the most severe operating conditions, functioning as a wafer valve disc at 25 psi pressure in sea water. Since long life and tight closing are essential in this application, corrosion resistant Type 304 Allegheny Stainless was specified.

Some unusual techniques were employed in the fabrication of this casting. Although the entire valve disc was cast as a single piece, its sides are hollow, with a skin only ¾″ thick. The center shaft was cast solid at the same time the side wings were cored, permitting the single piece, seamless part desired.

If you have a casting problem, or *any* problem that involves corrosion resistance, long life, resistance to wear and abrasion, call the Allegheny Ludlum Sales Office nearest you. An A-L Sales Engineer is ready to put his skills and those of the A-L Technical Staff promptly at your disposal, to serve your requirements from the largest and most complete line of stainless products on the market.

Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.

6963

Write for this 28-page booklet on A-L STAINLESS CASTINGS

28 pages of valuable and complete data on stainless castings: analyses, properties, technical data on handling and heat treatment, typical applications, how to order, etc.

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AL

ELECTRICAL POWER EQUIPMENT IN STOCK

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New G.E.	Enc. S.V.	475	320
1	3000	New Whse.	Enc. F.V.	525	600
2	2700	G.E.	Enc. S.V.	415	280
1	2250	New G.E.	Enc. S.V.	600	200/300
1	2200	G.E.	Enc. S.V.	600	400/500
2	2000	G.E.	Enc. S.V.	350	230/350
2	1750	G.E.	Enc. S.V.	250	175/350
2	1500	Whse.		600	300/700
4	1500	New Whse.	Enc. F.V.	525	600
2	1400	G.E.	MCF	250	165/300
1	1300	G.E.	MCF-12	300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	DS	600	600/900
2	900	G.E.	MCF	250	180/360
1	850	G.E.	MCF	250	85/170
2	800	G.E.	MCF	250	400/750
2	800	G.E.	MCF	250	780
2	750	G.E.	MCF	600	450/900
1	750	G.E.	M.F.	600	120/360
2	645	S.S.	V.G.	300	1000
4	600	Whse.		250	275/550
1	500	G.E.	MPC-10	250	188/400
2	450	Whse.		550	415
4	400	G.M.	DS	250	300/900
2	400	G.E.	CY-275	300	1000/1500
1	300	Cr.Wh.	H-102 B.B.	230	1200
1	150	Cr.Wh.	CMC-65H	230	1150
1	150	G.E.B.B.	CD	600	250/750
1	150	G.E.B.B.	CDP-125	230	1750
1	125	Cont. B.B.		230	1750
1	100	G.E.	CDP-115	230	1750
1	80	Whse.	SK-123.9	240	2000-4500
1	75	G.E.B.B.	CD-1235-D.P.	600	850

SWITCH GEAR

Large Stock Oil & Air C/BC can furnish in NEMA 1 Enc. or Open Magnetic or Manual Operation. What are your needs & I. C. Requirements.

MG SETS—3 Ph. 60 CY.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	4800	G.E.	450	300	2300/4600
1	2400	G.E.	450	300	2300/4600
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1750	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	Cr.Wh. 4 unit	720	100	2300
1	1000	G.E.	900	600	2300/4000
1	1000	G.E.	720	250	2300/4150
1	1000	G.E.	900	260	4000/6900
1	500	G.E.	900	125/250	440
1	500	G.E.	900	250	2300/4600
1	500 (New)	G.E.	1200	300	2300
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	250	G.E.	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2200
1	200	El. Mby.	1200	250	2300/4600
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	125	440
	140	Cr.Wh.	690	125/250	2300
1	100	G.E.	1170	250	220/440
2	100	Cr.Wh.	81160	525	220/550
1	100	G.E.	1200	250	2400/4100
2	75	Whse.	1200	125	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
1	3000	A.C.	OISC	3	34500 x 2300
3	1000	G.E.	OA/FA	1	13800 x 230/460
3	833	A.C.	OISC	1	4800/2400 x 480
3	833	A.C.	OISC	1	10175/13475 x 2300/4000
2	750	G.E.	Pyranol	1	4800 x 85/55-255/165
3	500	Mal.	C	1	6600/11430Yx480
3	500	Kuhl	OISC	1	13200 x 6600
3	150	G.E.	OISC	1	33000x2300/4000Y
3	167	G.E.	HS	1	13800 x 240/480
3	100	G.E.	HS	1	4800/8320Y x 120/240

CRANE & MILL MOTORS

230 V. D. C.

Qu.	H.P.	Make	RPM	Type
12	12/14	Whse.	700/600	MCA-30, Series
1	20	Whse.	975	K-5 Series
2	23	G.E.	650	MDS-408 Shunt
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 Sh. R.B.
1	45	Whse.	600	CK-9 Comp. S.B.
3	50	G.E.	650	COM-1830 Comp.
2	50	Whse.	525	CK-9 Shunt R.B.
2	50	Whse.	600	CK-9 Comp. R.B.
1	50	G.E.	525	COM-1830AEB.B.
1	50	Cr.Wh.	550	SW-50 Comp.
9	125/165	G.E.	625/575	CO-1832 Ser.
1	100	G.E.	475	CO-1832 S.B.
6	100-140	Whse.	500/415	MC-90 R.B.

Above only partial listing of our available stock.

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New York Business Remains Slow

Used machine dealers in the New York area report that sales are still slow and only inquiries are coming in.

They look forward to increased defense work and hope it will mean a resurgence of business.

■ On the basis of actual business, the used machinery market in New York is very slow. It's just about the same now as it was at the beginning of the year. Any improvements have been almost negligible.

But on the basis of inquiries, things look brighter.

As one dealer puts it, "We are getting very good inquiries, but few conclusions."

Window Shopping—Some dealers are somewhat afraid these inquiries might be deceptive. "Whenever anyone thinks he has a chance to land a new contract, he goes shopping to see if he can get the equipment he would need," explains a dealer. "But when there are 15 people after the same contract, we are liable to get 15 inquiries, only one of which will actually place the order."

Optimists in the market point out that many of the inquiries are for large, heavy-duty equipment. "Only a couple of sales like this every month would put us in very good shape," says one dealer.

Well Stocked — Most dealers agree that the lack of buying can not be due to the type of equipment available. "You can get almost anything you want in the way of used machinery and equipment," reports a dealer. "And most of it is in good shape."

Several dealers indicate they are optimistic, but for no particular reason. They just have the "feeling" that a good percentage of inquiries are going to turn into sales.

Broad Outlook — One dealer takes the broad viewpoint. "With the feeling that's been generated at the Summit Conference, and around the UN these days, I think defense business is likely to pick up. And more new contracts will mean more sales of good, used equipment."

Both the bulls and the bears in this market pretty much agree on one thing. The market is sitting on the fence, ready to go either way.

Coming Soon—Either the heavy rate of inquiries will dry up, or a good part of them will turn into business. And few dealers expect to have to wait very long to see which.

"Pretty slow, how are things with you?"

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Steel Underframe

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3, G. E. 44-Ton, 400 H.P., Std. Ga.
1, G. E. 80-Ton, 500 H.P., Std. Ga.
1, 125-Ton RAILROAD TRACK SCALE

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1—3-HIGH PLATE MILL 40" & 26½" x 112".
1—32" & 20" x 110" PLATE MILL, 3-high.
1—25" & 42" x 66" HOT STRIP MILL, 4-high.
1—16" x 30" 2-HIGH MILL, with 400 HP motor and gear drive.
1—3½" & 8½" x 5½" STRIP MILL, 4-high.
2—28" 3-HIGH ROLL STANDS.
1—18" 3-HIGH BAR MILL, single stand.
1—NEW 16" BAR MILL, 3-high, single stand.
1—10" BAR MILL with motor and gear drive.
1—9" BAR MILL 3-high, five stands.
1—34" x 192" ROLL GRINDER.
1—450 TON DOWN-CUT CROP SHEAR, 14" stroke, length of knives 28".
1—OPEN SIDE BAR SHEAR, Williams & White No. 14½, 1¾" round.
1—SHEAR, 1" x 110" plates.
1—LEVELLER, 1" x 104" plates.
1—ELECTRIC MELTING FURNACE, 1-ton capacity, 800 KVA transformer.
1—ROLL LATHE, ENCLOSED HEADSTOCK, up to 36" dia. rolls.
1—MAGNETIC SEPARATOR double pulley, Stearns.
1—SIDE TRIMMER, Strains, maximum width 48" makes 2 cuts 3/16" mild steel.
1—60" BACKED-UP ROLLER LEVELLER, work rolls 1½" dia.
1—HALLDEN STRAIGHTENING and cutting-off machine, capacity .562" brass rod.
1—POINTER, tube 2" O.D. x ¼" wall maximum.
1—1500 HP GEAR DRIVE, 7.5 to 1 ratio.
1—1200 HP GEAR DRIVE, 295 to 30 RPM.
1—1200 HP GEAR DRIVE, 353 to 94.5 RPM.
1—600 HP GEAR DRIVE, 1.698 to 1.
1—400 HP MOTOR, 2300/4600 volts, 3 phase, 60 cycle, 450 RPM.

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LATHE, TURRET, 9¼" hole No. 4L Gisholt hy. dy. saddle type cross feeding turret
LATHE, TURRET, 8¼", No. 2H8 Libby hy. dy. saddle, hard ways
LATHE, AXLE, 28" swing, 8' ce, Betts Bridgeford geared center drive
MILL, PRODUCTION, No. 5/48 Cincinnati hydromatic bed type duplex
MILL, BORING, 5" bar Sellers horizontal, 15 HP, MD
MILL, INGERSOLL, 42" x 42" x 18' planer type, adjustable rail, double housing
MILL, PLAIN, No. 2 Cincinnati plain rec. overarm, PRT, MD
MILL, THREAD, Model CT-36 Lees Bradner, internal or external
MILL, ROTARY, 54" two spindle continuous, sliding head, sliding table
PLANER, 36" x 36" x 10' Liberty dbl. housing, adjustable rail, power elevation
PRESS, COINING, 400 ton No. 663 Toledo SBG
PRESS, DRAWING, 260 ton No. 795½-72 Toledo, DC, DBG toggle drawing, air clutch & brake
PRESS, HYDRAULIC, 350 ton Elmes self contained 4 post downward working (3)
PRESS, FORGING, 1000 ton Model 10C Ajax S.S., SBG, all steel, air clutch
PRESS, OBI, 75 ton Model 700B Perkins OBI, MD, new 1949
PRESS, PUNCHING, 75 ton P-5 Ferracute C frame
SAW, COLD METAL, 10½" x 10½" No. 3 Motch & Merryweather circular, 10 HP motor, late
SHAPER, 26" Morton draw-cut with vise
SHAPER, 28" G & E Industrial, plain, horizontal, hy. dy. (2)
SHAPER, 66" Rockford hy. dy. wide pattern, open-side shaper planer
UPSETTER, 4" National high duty with National air clutch and brake, new about 44
UPSETTER, 4" National high duty suspended and overarm guided ram, 50 HP motor.

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1—10" Dia. x 20" Face 3-Hi Experimental Mill with 35 H.P. Motor.

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MACHINES FOR YOUR YARD

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BROACHING MACHINES
Model HD 10-90 American Broach & Machine Co., Horiz., m.d.
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10 ton, 84" stroke LaPointe Single Ram Vertical Surface Broach, m.d., late
Type SBD-42-6 American Vertical Hy. Dup. Broach
Type SBD-48-15 American Vertical Dp. Ram Surface Hydraulic Broach

RADIAL DRILLS
2½"-7½" column Cincinnati-Bickford, m.d.
3'-9" col. American Hole Wizard, m.d.
3'-9" col. Cincinnati-Bickford, m.d.
6'-17" col. American Triple Purpose, m.d.
7'-16" col. American Triple Purpose, m.d.
Baush Radial Drilling & Tapping Machine, m.d.

BALL BEARING DRILLS
No. ½ Avey MA8, m.d.
No. 2 Avey, m.d.
No. 2LMS Leland & Gifford, m.d., H.S.
No. 2LMS Leland & Gifford, single spindle, H.S., m.d.
No. 4BM Fosdick, single spindle H.S., m.d.
No. 4MS Leland & Gifford H.S., 4 speed A.C., m.d. to spindle
1 spindle No. 2MA6 Avey H.S. Type B, m.d., 7½" overhang, 1943
2 spindle Allen, belted m.d., 8" overhang
2 spindle No. 2 Avey H.S., belted m.d.
2 spindle No. 2BMA, No. 1 Avey Production Type, m.d.
2 spindle No. 2MS Allen, H.S., m.d.
2 spindle No. 2 Leland & Gifford H.S., 8" overhang, m.d.
2 spindle Leland & Gifford H.S., Hydraulic Type, m.d.
2 spindle No. 2LMS Leland & Gifford, hydraulic step by step H.S., m.d.
3 spindle No. 2B-8" Edlund, m.d., H.S.
3 spindle No. 2MA6 Avey, H.S., m.d.
3 spindle Leland-Gifford 2E1LMS—H.S., m.d., late
3 spindle Leland-Gifford H.S., m.d.
4 spindle Leland-Gifford, m.d., on each spindle
4 spindle No. 15 Buffalo Bench Type
4 spindle Allen H.S., belt drive
4 spindle No. ½ MA8 Avey, m.d., H.D.
4 spindle Demco H.S., individual, m.d.
4 spindle No. 2MS Eddlund, m.d.
4 spindle No. 2BMA6 Avey H.S., m.d.
5 spindle Allen H.S., belt drive
6 spindle Allen H.S., 7" overhang
6 spindle Leland-Gifford m.d., on each spindle, No. 2 Taper
6 spindle No. 1 Avey High Speed, m.d.
6 spindle No. ½ Avey MA8, m.d., H.S.

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1—N-*	2500	Whse.	700	108/162
1—N-*	2200	Whse.	600	92/132
2—N-*	2000	G.E.	350	230/350
2—N-*	1750	G.E.	600	200/300
1— *	1500	Al.Chal.	600	120/240
3—N-*	1500	Whse.	600	300/700
2—N-*	1400	G.E.	250	165/300
6—N-*	750	Whse.	250	300/700
1	750	Whse.	250	200/400
2— *	650	S.&S.	300	1000/1350
2	600	Al.Chal.	600	300/600
1	600	Whse.	250	110/220
2	300	Whse.	230	300/600
2	235	Whse.	230	325/975
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An asterisk indicates that a booklet, or other information, is offered in the advertisement.

This index is published as a convenience. No liability is assumed for errors or omissions.

A

*Advance Glove Mfg. Co. 143
Ajax Electric Motor Corp. 169
*Ajax Manufacturing Co. 21
Aldrich Pump Co. 13
*Allegheny Ludlum Steel Corp. .. 167
Aluminium Limited Sales Inc. 127
*American Brass Co. 121
*American Chain & Cable Co., Inc., Wright Hoist Div. 45
American Hoist & Derrick Co. .. 170
*Armstrong Bros. Tool Co. 141

B

B & T Machinery Co., Div. Greenlee Bros. & Co. 84
*Babcock & Wilcox Co., Tubular Products Div. 4
Baldwin-Lima-Hamilton Corp., Industrial Equipment Div. 73
Barber-Colman Co. 130-131
*Beatty Machine & Mfg. Co. ... 135
Belyea Co., Inc. 168
Bertsch & Co. 143
*Bethlehem Steel Co. 1, 17-20
Birdsboro Corp. 44
*Bliss, E. W., Co., Rolling Mill Div. 59
*Bullard Co. 78

C

Calumet Iron & Supply Co..... 170
Canton Drop Forging & Mfg. Co. 133
Capewell Mfg. Co. 11
Cincinnati Milling Machine Co., Cincinnati Milling Products Div. 38
Cincinnati Milling Machine Co., Special Machine Div. 82
Cincinnati Shaper Co. 51
*Cleveland Tramrail Div., Cleveland Crane & Engineering Co. . 55
*Climax Molybdenum Co. 30
Clymer Associates, Inc. 138
Colorado Fuel & Iron Corp. .146-147
Columbia Tool Steel Co. 133
*Columbus McKinnon Chain Corp. 96
Consumers Steel & Supply Co.... 170
*Cosa Corp. 46
Crucible Steel Co. of America..36-37
Curry & Hudson Associates, Inc. 169, 170
*Cyril Bath Co. 62

D

*Diamond Manufacturing Co. ... 153
*Dravo Corp. 94-95
*Duraloy Co. 137

E

Eastern Machinery Co. 169
Electric Equipment Co. 170
Electric Furnace Co. 117
Erie Forge & Steel Corp. 14
*Ex-Cell-O Corp. . Inside Front Cover

F

Falk Machinery Co. 170
Fenn Manufacturing Co. 120
Foster, Frank B., Inc. 169
Frasse, Peter A., & Co., Inc. 81

G

Gilbert Merrill Steel Corp..... 170
*Gisholt Machine Co. 33
Goodrich, B. F., Industrial Products Co. 5
Goss & DeLeeuw Machine Co. 133
Great Lakes Founders & Machine Corp. 165
Greenlee Bros. & Co., B & T Machinery Co., Div. 84

H

*Handy & Harman 58
Hanna Furnace Corp. 155
Harbison-Walker Refractories Co. 41
Harris Foundry & Machine Co. .. 74
*Hitchiner Mfg. Co., Inc. 129
Hoffman, A. J., Co..... 170
Houghton, E. F., & Co. 118-119
Hughes, Arnold, Co. 170
Hyatt Bearings Div., General Motors Corp. 16
Hyman, Joseph, & Sons 170

I

Industrial Equipment Div., Baldwin-Lima-Hamilton Corp. .. 73
*Ingersoll-Rand Co. 32
Inland Steel Co. 8
Iron & Steel Products, Inc. 169

J

Jessop Steel Co. 56-57
*Jones & Lamson Machine Co. 87, 89, 91 & 93
*Jones & Laughlin Steel Corp., Stainless & Strip Div. 76

K

Kaiser Aluminum & Chemical Sales Inc. 22-23
Keokuk Electro-Metals Co. 148

L

Lang Machinery Co., Inc. 170
*LaSalle Steel Co. 24
Levinson Steel Co. 51
Luria Bros. & Co., Inc. 157

M

*McKay Machine Co. 97-99
MacCabe, T. B., Co. 170
Midvale-Heppenstall Co. 100
Miles Machinery Co. 169
*Miller Electric Mfg. Co., Inc. .. 132
Minster Machine Co. 39
Morse Chain Co. 34-35
*Mundt, Chas., & Sons 165

N

National Acme Co. 28-29
National Machinery Co. 138
National Machinery Exchange .. 169
National Steel Corp. 155
New Britain-Gridley Machine Div., New Britain Machine Co. ..123-124
New Britain Machine Co. 123-124
*New York & New Jersey Lubricant Co. 151
*Niagara Machine & Tool Works 49
Nicholson File Co. 48

P

*Pacific Industrial Manufacturing Co. 26-27
*Pangborn Corp. ..Inside Back Cover
Pathex Inc. 170
Peterson Steels, Inc. 122

R

*Republic Steel Corp. 42-43
*Research-Cottrell, Inc. 52
*Rockwell Manufacturing Co., Walker-Turner Div. 144
Rolock, Inc. 142
Rolled Alloys, Inc. 134

S

*Salem-Brosius, Inc. 47
Scovill Mfg. Co., Mill Products Div. 139-140
Smith, A. O., Corp. 50
Southern Screw Co. 15
*Spencer Turbine Co. 145
*Steel Service Center Institute, Inc. 40
Steel & Tube Div., Timken Roller Bearing Co. .....Back Cover
Sun Shipbuilding & Dry Dock Co. 133
*Surface Combustion Div., Midland-Ross Corp. 12
Sylvania Electric Products, Inc. ... 54

T

*Thomas Machine Manufacturing Co. 141
*Thompson, Henry G., & Son Co. 25
Timken Roller Bearing Co., Steel & Tube Div. .....Back Cover
Torrington Co. 10
Tractor & Equipment Co. 169

U

Union Carbide Metals Co., Div. of Union Carbide Corp. 60
United States Steel Corp. 172
U. S. Steel Wire Spring Co. 151
*Universal Atlas Cement Div., United States Steel Corp. 172

W

*Walker-Turner Div., Rockwell Mfg. Co. 144
Wallack Bros. 170
Ward Steel Co. 138
Warner & Swasey Co. 6
Wean Engineering Co., Inc. 53
Weiss Steel Co., Inc. 170
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp. 146-147
*Wright Hoist Div., American Chain & Cable Co., Inc. 45

Z

*Zak Machine Works, Inc. 143

CLASSIFIED SECTION

Clearing House 168-170
Contract Manufacturing
Appears in first and third issue of each month. See June 2 or June 16.
Employment Exchange 171
Equipment & Materials Wanted.. 170

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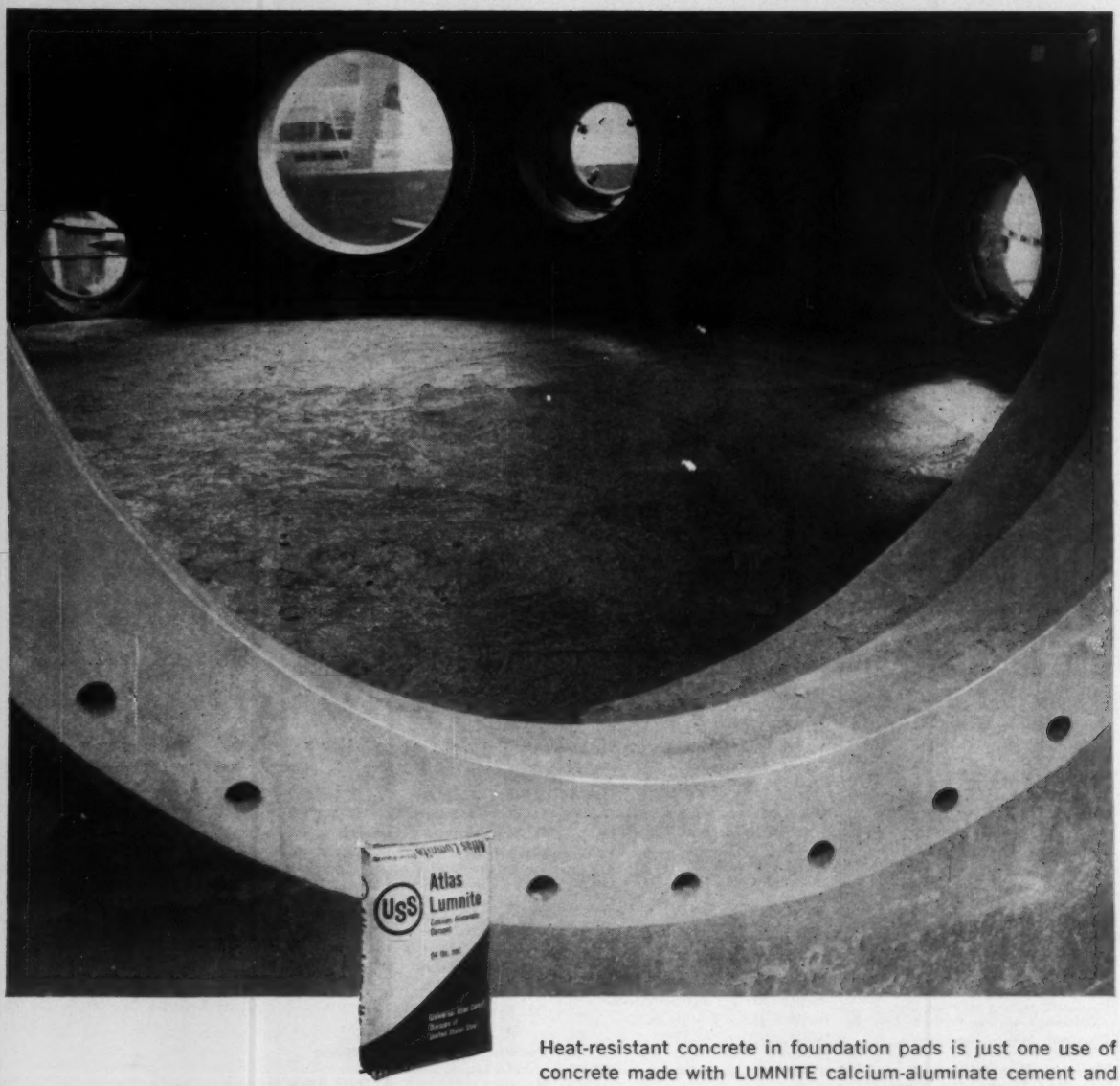

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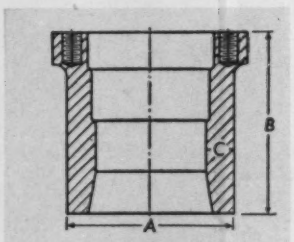

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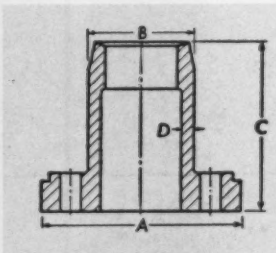

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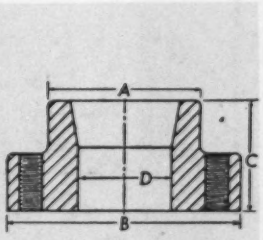

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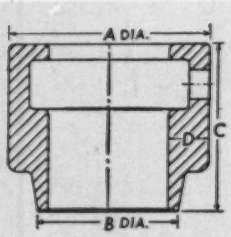

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